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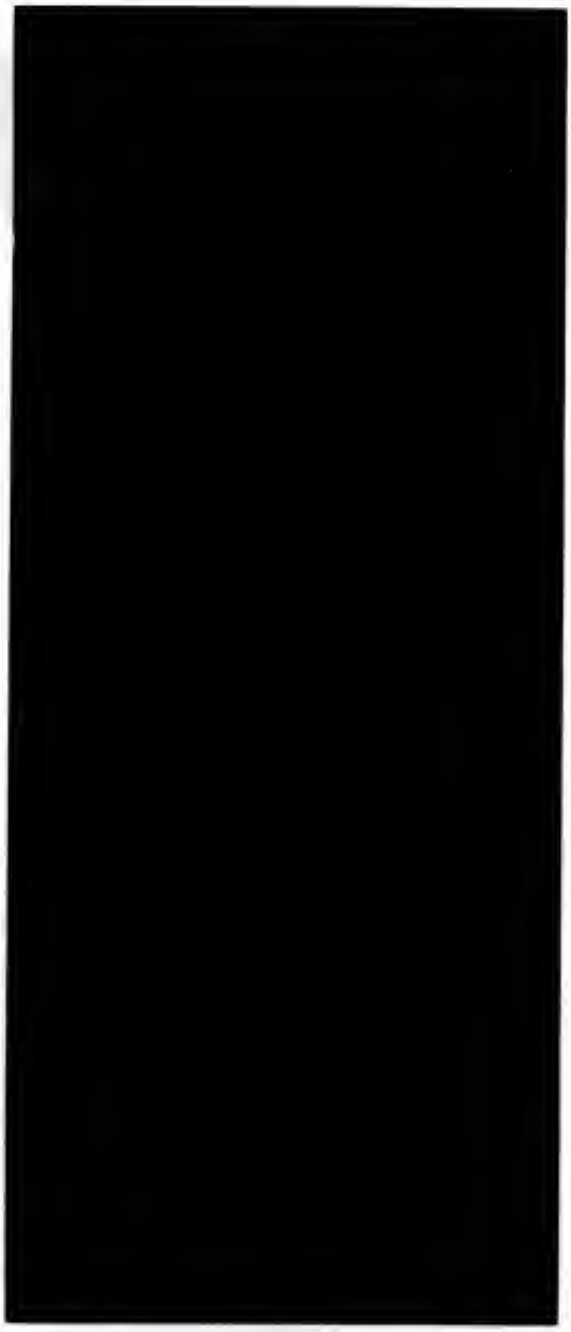

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ABOUT THIS ISSUE

Microcomputing in the latter part of the '80s is at a pivotal point, moving from maverick to mature technology. It is no longer enough to use the myriad of individual micros for stand-alone applications; MIS and users are looking for connectivity and want to exploit the added potential of more powerful machines. MIS must stay informed of these changes and help lead the charge to revolutionize the way companies do business.

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MICROCOMPUTER VIEWPOINT

EDITORIAL

A New PC Era?

The personal computer may be on the brink of another history-making era. The PC is the undisputed cornerstone of almost any office system and is a major decision factor in integrated system purchasing plans. The PC continues to gain in popularity due to its flexibility and low pricing, and recent price cuts have only added to the demand from end users.

But things are far from perfect in this Garden of Eden. From the very onset, personal computers have spelled trouble for the MIS manager. While many in MIS have learned to accept and even become proponents of PCs, these systems are still a thorn in managers' sides.

Confused corporate strategies, uncontrolled growth, lack of standards and technical promises that have not yet come true are all working to negate the benefits of corporatewide PC usage. Too little emphasis on training has caused many PCs to remain as dust collectors on too many desks. And vendor hype notwithstanding, PCs are far from being able to be integrated into larger corporate DP systems. Incompatibility among different PC software programs is rampant, and incompatibility between PCs and minis or corporate mainframes is the norm.

The attempt toward integration is going to be a major thrust from vendors during the next few years, but end users are notoriously impatient. This is the same group, of course, who leapt on the PC bandwagon in hopes of circumventing MIS and avoiding the long application backlog cycle. Because many vendors still promise blue skies in terms of micro-to-mainframe links or systems integration, MIS could again be viewed by end users as the villain in this story, unwilling (rather than unable) to grant their requests. Even though vendors are racing to fill the integration gap because they see potential new markets and more sales, it will never be soon enough for some power-hungry computer users.

While some vendors are following this integration route, others are working to provide more power on one machine — namely the Compaq Computer Corp. Deskpro 386. This month's Comdex/Fall show promises to produce a number of enhancements and offerings from vendors of Intel Corp. 80386-based machines.

Many analysts and users, however, claim that 80386-based systems are technological overkill — that the IBM Personal Computer XT or Intel 80286 haven't been pushed to the limit of their capabilities. This group maintains that the current slowdown in PC acquisitions is due to lack of software and new kinds of applications rather than speed or power limitations in the hardware. We may find out the answer when we see how many of these 386-based machines organizations buy. If other predictions are true, however, the 80386 chip will usher in a whole new multiuser phenomenon that could revitalize the market. Let's see what the new year brings.

Ann Dooley

The Year That Was

INSIDER
Timothy J. Caffrey

Only two really interesting things happened in the microcomputer industry in 1986.

The first was a process rather than an event. During the course of 1986, it became clear that IBM really didn't hold the industry in an iron grip. Observers, who had long claimed that the PC was fast becoming a commodity, sat back in satisfaction as thousands of cheap clones poured into U.S. markets.

It was even more satisfying to see these clones picked up not only by the man on the street but also by corporate America. In the last months of 1986, it will be almost as likely to see a nameless microcomputer on the desktop as it will be to see one bearing the IBM label.

The repercussions of this process are just becoming clear. The influx has accelerated the rate of price decline for personal computers overall and thereby changed their perceived role in the workplace. There is some difficulty, after all, in getting excited about a personal computer that costs little more in stripped-down form than a good office chair or a filing cabinet.

For microcomputer and MIS managers, the commoditization of PCs makes attempts at control all the more difficult. It may be this process of 1986 that finally and fundamentally changes the relationship between MIS and the end user.

Commoditization has also changed the relationship between IBM and the marketplace. Bashing Big Blue, a diversion long popular in some circles, has become de rigeur throughout the industry. While the predictions of IBM's imminent decline hold as much merit as any story about an AT&T merger, IBM *has* suffered at the hands of the clone makers.

For the first time in five years, microcomputer buyers listen seriously to speculation about new leadership in the personal computer industry. Whether the scenario involves a triumvirate of guiding lights such as Intel Corp., Microsoft Corp. and Phoenix Systems, Inc. or depicts an industry in which IBM is just one of several large suppliers, the view to the horizon is radically changed.

The second interesting occurrence in 1986 was actually an event. In early September, Compaq Computer Corp. the follower became Compaq the leader when it announced a system based on the 32-bit Intel 80386 microprocessor.

Initial reaction, as expected in the gloom of a prolonged slump, was mixed. Criticisms ranged from its relatively high price to the claim that Compaq was entering a market that would not even exist until IBM defined it. The most compelling statements, however, came from those who said, "So what?" Certainly, the 386 represents another in a long string of advances in microcomputer speed, power and price/performance. But the overwhelming indifference to these advances signals a refreshingly new attitude toward computerized sledgehammers.

Faster, not necessarily better

For the microcomputer manager faced with complex demands and depleted budgets, smaller and faster is not necessarily better. The 386 does mean that outspoken leading-edge users will have a new machine to master. But for the vast majority of users, long-term needs will be better served by software that they understand, easy communications links and a friendly voice at the other end of the Help line. None of these needs will be directly addressed by bringing in faster boxes.

If the announcement of the 386 nudges the industry into a recognition that the problems of microcomputer management will not be solved by a faster chip, then 1986 was clearly a very good year.

For 1987, the writing is already on the wall. As IBM and others enter the market with their own versions of the Compaq 386, the distinction between personal and departmental computing hardware will quickly blur. The effects of commoditization could begin to creep up the power scale. As the effects of that process begin to wreak havoc on the industry, many vendors will look back wistfully to the Golden Age of the early '80s.

Caffrey is vice-president of Office Automation Services at International Data Corp. in Framingham, Mass.

dilB

BY RICH TENNANT

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MICROCOMPUTER VIEWPOINT

Author: Rest Easy By Avoiding Micro Nightmares

Howard Hillman has been a computer consultant and lecturer for several years, analyzing the microcomputer field from a slightly different perspective. A Harvard Business School graduate, he has recently written a book called Avoiding Computer Nightmares, ***which looks at many of the problems of corporate microcomputing that Hillman has seen and experienced during the years.***

The president of New York-based Howard Hillman Publications spoke with Computerworld Focus ***senior writer Stan Kolodziej about the often tricky and sometimes hazardous life of the corporate micro user.***

What are some of the more prevalent hazards stalking today's microcomputer users?

The computer horror story knows no limitations as to user and size of company. Some of the biggest problems occur due to executives carrying floppy disks with them on business trips. These disks can contain valuable data of a personal and corporate nature. The trouble starts as soon as they hit one of the airport security checkpoints. Most executives are concerned about the X-ray machines, but heaven help them if they carry disks when they go through metal detectors or when they are approached by a guard with a metal detector rod. Electromagnetic waves generated by the detector can do more damage than X-rays. The best way is to hand your disks to the person near the conveyor belt.

It's a good idea for executives to make duplicates of the floppy disk before they leave on a trip, just in case. There are also new, easy-to-carry boxes lined with metal on the market that are good for keeping out rays.

What about hazards with portable computers?

More businessmen are going to be carrying the new breed of portables that are powerful and very light.

Q&A

Illustration by Allen Hopkins

"

The computer horror story knows no limitations as to user and size of company.

Don't leave the computer in your car on a hot day, and don't take it with you on a cold day when you decide to get some brisk exercise by taking that long walk from your hotel to a meeting.

Cold weather itself isn't really going to damage the machine, but what you have to do is give the machine at least a half hour to adjust to the temperature in the room. The cold has slightly contracted the disk and because we're talking about the tight storing of data, that could scramble some things.

Another problem with this era of lap portables is not treating them with enough security. I've seen people at a conference check their portables into a coat check room, along with their hats and umbrellas.

A portable is an expensive machine, and it could have critical data on it, sometimes information confidential to your company. . . . The least you could do is lock it into your suitcase.

I would guess problems don't stop when you get to the office.

Hardly. A lot of people are not aware of the damage caused by printer vibration. They will have a printer on the same desk as the computer. It's not such a concern if you're using a quality laser printer, but with dot matrix printers, no

See **HILLMAN** page 8

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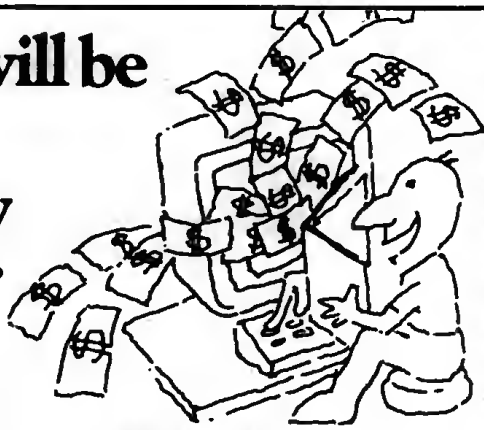

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MICROCOMPUTER VIEWPOINT

MILLMAN from page 6

matter how minimal the vibrations, they are going to gradually loosen certain chips in the computer sockets. It's not going to harm the computer, but it will cause downtime. If you have to put the printer on the same desk as the computer, make sure the desk is sturdy.

You can also prolong the life of your micro by not constantly turning it on and off. True, constant switching might extend the life of the motor and disk drive, but every time you turn it on and off, you send a jolt to the circuitry, which is going to shorten its life. Don't leave it on all night, just during the regular working hours.

Is there danger in the corporate air?

Everywhere. There are add-on fans that people use to keep their micros a little cooler. Your fan better be a quality one, because the bargain-basement variety generates a lot of vibration. [Fans] may be keeping the chips inside your computer circuitry cooler, yet they are also drawing in hair, dust and smoke. The dust settles on the circuitry and holds in heat, and heat is one of the computer's worst enemies.

Heat will give you computer glitches and damage circuitry. Get a quality fan with a good filter that is positioned just before the air enters the computer.

Are air cleaners a menace?

You bet. Why do you think they're called *electrostatic* air cleaners? They're good, but they also generate negative ions that attract dirt. If you put one of these cleaners on a white wall, you'll notice after a time that part of the wall gets a little dark. The ions are settling on the wall. If the air cleaner is near the computer, the ions will get inside the circuitry and start attracting dust. Keep the air cleaner at least six feet from your computer and away from your desk.

It seems there's been more concern lately with backing up microcomputer data.

More horror stories. Not making disk backups is the electronic equivalent of putting all your eggs in one basket. Any company that generates a lot of valuable data on micros should invest in a Bernoulli box. With hard-disk, micro backup storage, you will get only 20M bytes, possibly 40M bytes, and that's it.

The Bernoulli box is an unlimited megabyte storage device because it just takes another plug-in cartridge for more storage. You can send the cartridges across the country — can you imagine the cost and time of sending 20M bytes of data by modem? — and it's just as fast and far more dependable than a hard disk.

Are there any broader corporate problems you've come across?

Being a guinea pig or beta test site for software vendors' new products. Being the first to test somebody's program also means enjoying the program's bugs.

Another headache are those 30-day offers from vendors. If you're not happy with the product after 30 days, then you get a full refund. That's reassuring to those who have put in 30 days investment in learning the product and possibly have stored data in a format that can't be used in another program.

Be leery of the checklist game. You know, when a software vendor gives you a checklist of 10 points comparing its product with the competition's. Of course, there could be 40 other factors not listed where the competition beats their product hands down.

Dare I ask if there are horror stories with consultants?

Many, and they keep occurring again and again. A client can let himself be painted into a corner by a consultant who installs a system and provides no out to switch to another system. That client is then locked into a specific consultant. Choose consultants carefully and avoid buying so-called state-of-the-art programs and equipment. It's an industry joke that the definition of state of the art is: "If it works, it isn't state of the art."

Any parting words?

Yes. A fool learns from his own mistakes; a wise man learns from the mistakes of others. It's best to keep in mind that sooner or later Murphy's law will catch up to you.

MICROCOMPUTER VIEWPOINT

Decision Making And DSS: Changing The Way Managers Work

ISSUES AND ANSWERS

Robert D. Gilges

Decision support systems (DSS) have turned decision making into a market, adding a remarkable new dimension to an ancient intellectual and administrative process.

Of course, this is not to say that decision support has replaced management decision making.

Rather, the rise of DSS is an example of how technology can convert something that has been intangible and not qualifiable into a business. Decision support is changing the way managers do their work.

The growth of the decision support market is well documented. While both market definitions and size estimates vary, software and services related to management decision making probably constitute a $2 billion business today, one that will likely near $5 billion in 1990.

Both microcomputer and micro-mainframe communications have been key to the growth of decision support. Today, these two segments appear to account for slightly less than half of the total software service management science market.

The numbers tend to support an observation repeated often, namely, that micro-to-mainframe connectivity "made" decision support. A closer look suggests something more subtle. Many managers continue to access a variety of decision support tools on either stand-alone micros or through the use of the remote time-sharing systems.

DSS market segmentation relates directly to the debate on exactly what constitutes a DSS. For a long while, advanced professional consensus has been that true decision support involves not only computational, analytical and reporting/graphics capabilities but also the functions normally associated with data base management systems. Add to that the ability to access external or environmental data, the facility to relate the data to internal corporate files and a high degree of local connectivity, and you have the DSS paradigm embedded in the mainframe-micro software market.

Rules vs. guidelines

The problem with paradigms driven by professional consensus is that they can become rules rather than just guidelines adaptable to specific situations. The spectrum of end-user requirements and capabilities is probably greater in the DSS market than in any other. This means different organizations will need different approaches to decision support. The survival of time-sharing applications for management decision making and the rapid growth of micro software are manifestations of this condition.

What companies need is to develop plans for flexible end-user computing, including DSS, that meet current needs and promote the development of future applications. More productive management should be another result of flexible, evolving end-user computing facilities. Experience suggests that savings do, in fact, accompany increased functionality and new applications promoted by superior end-user system plans.

Many executives are reassessing the impact and benefits that can be derived from end-user systems. One fair conclusion must be that the office of the future has, indeed, arrived.

True, current systems are not perfect and some companies have been more successful with DSS technology than others. Nevertheless, the evolution of a DSS market signifies an improved approach to the way a business is run. On the whole, the computer profession deserves credit for this one.

Gilges is partner in charge, Information Systems Services Consulting Practice, at Peat, Marwick, Mitchell & Co. in New York.

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CIRCLE READER SERVICE NUMBER 134

MICROCOMPUTER VIEWPOINT

Ways To Improve Your DP/User Relationship

MANAGER'S CORNER
Jim Young

Do you say you suffer from user hostility? Do you feel that management sometimes thinks that data processing is an extravagance? Do you get the idea that no matter how effectively you perform, the rest of the organization will find fault and somehow expect more? If so, you need to know some of the tricks of the trade guaranteed to improve user interest, increase awareness and make the cooperation part of the DP job somewhat easier.

Not every DP department has these problems. In some instances, its role is so specific and clearly defined that the need for a more cooperative working relationship is unnecessary. And, in many cases, DP knows the tricks we are about to explore and has already solved the puzzle. The rest of us, however, have to recognize that in many ways we have a monopoly on internal DP resources, and monopolies are never popular. The following are some approaches that DP can use to achieve user satisfaction.

■ *Form a top management steering committee.*

One of the toughest audiences is the executive committee of an organization. By establishing a forum that allows the committee to set direction, prioritize key issues and generally communicate to DP, a manager can assuage the group's feeling of a lack of control. The group can integrate the DP department's direction with company strategic plans.

Moreover, this setup also gives DP a chance to present some of the toughest issues and ask for input. Instead of condescension, DP may get some guidance or, at least, some sympathy.

■ *Start a users coordinating committee.*

A similar technique can be equally as successful for middle managers from the user community. Such a committee cannot chart the direction of DP but can contribute in a meaningful way by prioritizing second-tier projects, approving user requests, monitoring resource use by users and communicating user plans and activities. Periodic meetings give the opportunity to exchange concerns and build rapport. The openness that such an armistice encourages is a platform on which to build stronger relations.

■ *Begin a users group.*

There is one group that is usually the last to receive any consideration but is just as typically the most in need of appeasement — the users. Their input on service levels is very important as is their understanding of the technical environment that serves them. Therefore, the format of a users group leans heavily toward the sharing of ideas, education and participation.

Regular, formal meetings are just one way to improve working relations with users. Easier, more specialized ideas such as those noted below can be used to supplement the more common methods.

■ *Conduct departmental tours.*

Let the rest of your organization see where and how the DP staff lives.

■ *Host an open house.*

Invite everyone to meet the staff, see systems demonstrations and have some refreshments. It may be the first time DP employees will have carried on a conversation with users that was not conflict oriented.

■ *Develop a user manual.*

Explain in simple terms what DP does, how it can help and what the rules are.

■ *Orient new employees.*

Make sure new employees know about DP's services.

■ *Write management status reports.*

Update top management in writing concerning salient DP projects and overall performance. This can also be circulated to key users to keep them in the picture.

■ *Start a newsletter for users.*

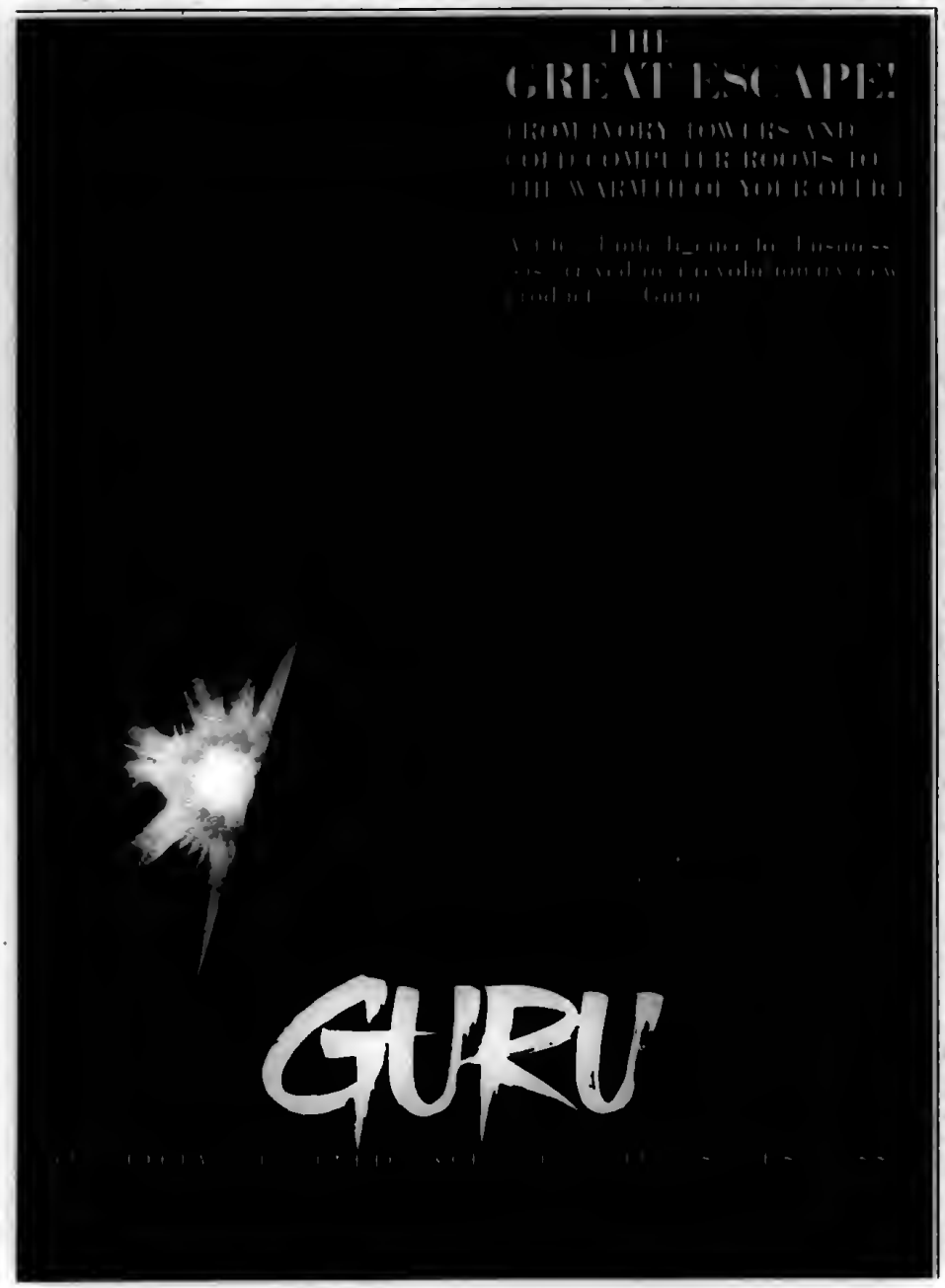
Let users know about the latest developments, tips, personnel news, feedback and the like. This is an excellent place to feature successful users.

There are certainly other useful methods to improve your relations with your users and in the process improve the quality and helpfulness of your service. All of them share the common goals of developing a user dialogue, asking users to understand DP directions and issues, establishing two-way communication and generally getting people interested in or, at least, thinking about DP.

Any or all of the above tools should and can be used to build a balanced relationship. Each should, of course, be used in moderation since it would be a mistake to overpower users or to monopolize everyone's time and attention.

However, used skillfully, a blend of these ideas can constitute a successful user relationship program. The key to organizational success is to have everyone working together. For a discipline as new and as complex as DP, normal business procedures sometimes fall short of bridging the client service gap. A special program is one way to overcome that obstacle. And it could be the beginning of a beautiful friendship.

Young is principal and director of consulting for Authur Young & Co. in Worcester, Mass. He has worked in the industry for 15 years.



MICROCOMPUTER NEWS

On The Microcomputer Beat

IBM, Convergent, CD-ROM Top The News

PC UPDATE

To users, analysts and vendors, the IBM Personal Computer XT Model 286 potentially spells trouble — but for different reasons.

The PC XT 286 was introduced as a replacement for IBM's mid-range Personal Computer AT, but dealers and analysts said they anticipate that the $3,530 PC XT will cut into the sales of both the high-end and entry-level PC ATs. Both the XT 286 and the high-end AT have a 1.2M-byte floppy disk drive and similar memory. Users may not be compelled to pay the extra $1,300 for the AT to get faster disk access and greater hard-disk capacity, analysts and vendors argue.

Others said that the entry-level PC AT will be overshadowed by the similarly priced PC XT 286.

While both use 6-MHz Intel Corp. 80286 processors, the entry-level AT does not have a hard disk drive.

By contrast, many users said that the cost difference does not justify the purchase of an XT 286 over a high-end AT. They argue that the slower clock rate and disk drive defeat the purpose of having an 80286-based computer.

Whereas the PC AT has an 8-MHz clock rate, the PC XT 286's rate is 6 MHz. Also, the high-end AT supports up to 60M bytes of hard disk memory; the PC XT only supports a 20M-byte disk. Other 80286-based machines have a 20M-byte hard disk, but unlike the PC XT 286, most allow users to upgrade.

■

In the information industry dating game, Convergent Technologies, Inc. has been the unlucky but undaunted lover.

In March, the San Jose, Calif.-based company saw its proposed merger with 3Com Corp. of Mountain View, Calif., collapse just days before its completion. 3Com's investment bankers, Robertson Colman & Stephens, called off the merger, reportedly to protect the interests of 3Com's stockholders.

At the same time, Convergent's OEM business with AT&T has been declining, contributing to Convergent's $5.1 million loss in its second quarter. The firm's shipments of the Unix PC and 3B1 to AT&T have dropped 30%, and Convergent said it expects Unix PC sales to AT&T to drop from $60 million for the first half of the year to less than $30 million for the second half.

Despite its troubled relationships with 3Com and AT&T, Convergent is buying into vertical market software vendors to offset its losses and expand its product offerings. The company has a 40% stake in Baron Data Systems Co., which sells legal systems, but Convergent's primary plan calls for an acquisition per quarter. It has already acquired Display Data Corp., a company that sells applications for lumber yards and auto and beverage dealers.

Display Data and other acquired firms will be incorporated into a wholly owned subsidiary, Convergent Small Business Services. Convergent is banking on the expectation that the subsidiary will help push the corporation's revenue to $300 million by the end of 1990.

■

Compact disk/read-only memory (CD-ROM) technology can handle fairly static applications like Microsoft Corp.'s compact disk containing the Encyclopaedia Britannica, but other companies are finding more dynamic uses. For example, Lotus Development Corp. and Strategic Intelligence Systems, Inc. are offering information services using CD-ROM storage.

Lotus plans to sell financial data through its product, One Source, which will include up to eight data bases containing 20 years of stock and bond information.

The One Source service will cost between $11,000 and $27,000, depending on the number of data bases the user includes, and users will receive updated disks weekly.

For daily information, customers can call Lotus's Signal stock quote service.

Strategic Intelligence Systems has offered several industry data bases on a dial-in basis, but in October, it began offering customers the option of using compact disks. The company, which updates its data bases monthly, has not decided yet how often it will cut a new compact disk. "We will need a large client base to cut a ROM disk every month," according to a Strategic Intelligence spokesman.

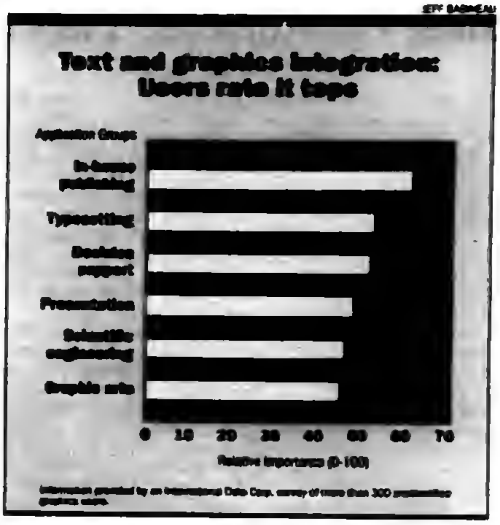
The U.S. Department of Education is also offering a CD-ROM service. The Educational Resources Information Center provides full references and summaries of educational papers from preschool to post-graduate levels. A three-disk set costs $2,000.

Such products will constitute part of the cumulative sales in the CD-ROM market, which are expected to reach more than $2 billion by 1990, said Steven Sieck, vice-president of electronic services at Link Resources Corp., a New York-based consulting firm.

■

Depending on the applications they use, users of in-house publishing systems rank output device characteristics differently. But users generally agree that some factors are more important than others, according to a survey of more than 300 graphics users published by International Data Corp., a Framingham, Mass.-based consulting firm.

Eight output device characteristics ranked by users were clearly divided in importance. Out of a possible 100 points, four qualities averaged between 50 and 60. The second tier of four averaged between 20 and 40. Print quality, with an average rank of 58.7, was the users' No. 1 concern. It was followed by device resolution, text/graphics integration (see chart this page) and device speed. The capacity for multiple fonts marked the beginning of the second tier with an average of 39.4 points, followed by noise level and color output. Brand name recognition was the weakest factor, garnering an average rate of 24.2.



Corporate Users Pressure Big Name Vendors For Site Licenses

Site licensing plans by large applications vendors such as Microsoft Corp., Lotus Development Corp. and Ashton-Tate are a direct response to demands from large corporations.

Users want to strike deals with Lotus, Microsoft and Ashton-Tate rather than negotiate with second-tier applications vendors, stated Ann Morley, an International Data Corp. (IDC) analyst, in her monthly software industry report. Until recently, the willingness of many corporate customers to work on applications companies' terms left vendors with little incentive to provide volume discount plans. Major corporations, particularly General Electric Co., have begun putting the pressure on by turning to second-tier vendors for site licenses.

In early 1986, GE struck deals for Officewriter from Office Solutions, Inc., Supercalc3 from Computer Associates International, Inc. and Easytrak from Planning Control International. GE reportedly will pay to the firms a one-time, up-front fee and then a fixed annual fee for unlimited copying rights, according to Morley.

Before the deals, the packages most used on GE's estimated 20,000 personal computers were Ashton-Tate's Multimate and Lotus's 1-2-3. Now, GE is encouraging users to choose Supercalc3, Officewriter and Easytrak by charging them to the corporate budget. Other applications not purchased on a site license basis will continue to be paid by individual departments. As a result, the site licensed products may become de facto standards at GE, a spokesman said.

Other firms turning to site licensing include McDonnell Douglas Automation Co. and Pacific Gas and Electric (PG&E). McDonnell Douglas purchased a volume license for Breakthrough Software Corp.'s Timeline project management package, Morley said. PG&E signed a deal to purchase up to 1,000 copies of Project Software & Development, Inc.'s Quiknet management software.

The benefits customers said they expect to receive from site licensing are lower costs, better support and freedom from copy protection. "Copy protection is an annoyance at best and can be the source of major frustration, irritation, wasted time and effort," said IDC analyst Will Zachmann in his "Office of Technology Assessment" report.

Copy protection makes it impossible to back up floppies, Zachmann noted, leaving the user reliant on the one backup provided by the vendor. Some copy-protected software cannot be installed on a hard disk, and even if it could, the protected applications on the hard disk could not be backed up, Zachmann argued. Such problems are simply multiplied in large corporations.

A benefit for vendors, too

The ability to offer discounts and remove copy protection benefits vendors as well. Removing copy protection means removing the development costs associated with adding it. Offering discounts to attract large users gives the vendor a strong and stable base of installed products, said Rick Meier, national sales manager for Office Solutions.

Major applications vendors, not to be pushed aside by the second-tier companies, have introduced their own volume purchase plans and have cut healthy deals with large corporations. Ashton-Tate, for example, has provided Zenith Data Systems Corp. with 38,500 copies of Dbase III, 46,500 copies of Multimate 3.3 and 6,000 copies of Dbase II, according to IDC's Morley. These applications will be bundled with the 90,000 personal computers that Zenith has contracted to sell to the U.S. Navy.

Users said that site licensing solutions provided by applications vendors are not a panacea, however. Lotus customers claim that the 500-package minimum required for special pricing, free support and removal of copy protection is too high. Users also criticize Microsoft's high price point. To benefit from Microsoft's corporate incentives, customers must buy $100,000 of Microsoft products each year. Ashton-Tate clients praise the company's across-the-board removal of copy protection but criticize its lack of discounts for volume orders.

MICROCOMPUTER NEWS

Intel Vs. Motorola: The Chip Wars

Now that the furor following Compaq Computer Corp.'s introduction of its Intel Corp. 80386-based computer has died down, the speculation about the future of the 32-bit microcomputer market begins in earnest.

Making it interesting is Motorola Corp.'s recent announcement of its 68030 processor, the most powerful of its highly successful line of 68000 32-bit processors, which to date have dominated the 32-bit market.

The battle lines are drawn. On the hardware side, Motorola claims the Intel 80386 is no match in power for the 68030, which packs 8 million instructions per second (MIPS) and offers four times the performance of the 80386 and double the performance of Motorola's 68020 chip.

On the software side, Intel points to the fact that the 68030 cannot run Microsoft Corp. MS-DOS programs, while its 80386 will be a double threat, being able to run Unix and MS-DOS concurrently. However, as yet no 386 machines run true Unix (only Microsoft Xenix) and probably will not for quite awhile.

Time seems for the moment to be on Intel's side. Besides Compaq, there are at least two other companies that have introduced 386-based machines. The real wave of 386 machines should hit offices by early 1987, cresting later in the year with IBM's predicted introduction of its 386 machine.

Motorola has some catching up to do. Although the company announced a 20-MHz chip in September, samples probably will not be available until early 1987, while full-scale volume shipments will not happen until the last quarter of next year.

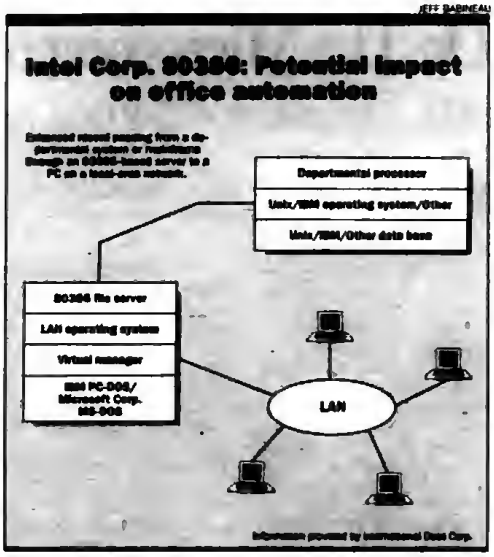
"The 386 will be the most important micro chip in 1987," claimed Steve Bosley, analyst at International Data Corp. (IDC) in Framingham, Mass. "It will appeal to the classic supermicro market of Unix-based 68020 machines costing $7,500 and up and will compete directly with Altos Computer Systems, Inc. and other supermicro vendors.

"It's too early to tell how the market will go. Vendors of 68020 machines are nervous about when the 68030 will appear, because the unit is not even in a silicon version yet. If the 80386 is going to eat into the Unix market, it will not happen for a while, because the Compaq machine is only running Xenix [V286] right now. What the 386 machines need is a full [AT&T] Unix System V to compete in this market," Bosley said.

On the other hand, Bosley explained, the 386 machines will have the potential to become file servers in multiuser, departmental computing — if the network server software materializes (see chart).

Bosley said the 386 market will open up when IBM enters in 1987, with IBM and IBM-compatible makers hitting market stride in 1988. IDC said it expects IBM to ship 60,000 386-based machines in 1987 and 190,000 in 1988. IDC predicts that compatible makers will ship 140,000 units in '87, climbing to 400,000 units in '88.

JEFF BARNEAU



Dataquest, Inc., a San Jose, Calif.-based market research firm, said it believes Intel will make big inroads into the 32-bit market in 1986. While Motorola had 60% of the 32-bit microprocessor shipments in 1985, with National Semiconductor Corp. at 33%, Dataquest said it expects Intel to command about 30% of the same market by the end of 1986. During the same period, however, Dataquest predicts Motorola's share will slip to 57% and National Semi's share to 10%.

Off-Loading Mainframe Program Development To Micros Gains Momentum

Can off-loading program development from mainframes to microcomputers finally be catching on in MIS shops? Realia, Inc. hopes so. The Chicago-based software company has recently introduced RealCICS, a product that allows the developing and testing of IBM CICS mainframe programs on IBM Personal Computer XTs and ATs. The company is hoping RealCICS can make a splash in what it perceives to be a market about to gain momentum.

At first glance, MIS could rightfully wonder if true mainframe CICS programs really can be created on XTs and ATs. Joe Koc, Realia director of sales, however, said that with 512K bytes of core memory and a minimum 10M-byte hard disk — Koc recommended a 20M-byte disk to be safe — on the micros and $2,000 for RealCICS (which is made up of two parts, a Cobol compiler for $1,000 and various utilities for $1,000), programmers are in business.

One beta site user, Analyst International Corp., a Minneapolis-based software developer, has been using RealCICS on a PC XT for two months to develop its own application generator, which it will later spin off for commercial use.

"The generator will work in both Data General Corp. and IBM CICS programming environments," explained Damen Patton, a director at Analyst International. "RealCICS is used to code and test Cobol programs. It's interactive, has quick simulation and translation, and it's saving us a lot of testing costs by staying away from batch. The Cobol compiler is very fast, and there's a good deal of code in the application generator, which RealCICS handles without a hitch. I think this stuff is the way of the future."

Other CICS/micro vendors might disagree. At a higher level and price tag than RealCICS comes a product called MicroCICS from Unicorn Systems Co. in Los Angeles. MicroCICS is a $4,495 package that runs on the IBM Personal Computer 370 series and that Unicorn said handles CICS off-mainframe program development the way it was intended.

"The PC 370 is basically a mainframe on a desk that runs [IBM] VM-compatible mainframe software and uses mainframe EBCDIC code structures, unlike most microcomputers," explained Viviene Campagna, a sales representative at Unicorn. "Micros also have the 640K-byte core memory limitation, with restrictions in data management record and file size. All of this puts a drag on programmers.

"PC-based programming also still leaves a lot left over in the mainframe," Campagna added. "It's not a true CICS programming environment but a PC workbench."

Vendor vitriol aside, there are definite advantages to off-loading software development from the mainframe. It frees the mainframe from resource drains and can improve programmer productivity by providing consistent response time and interactive software tools.

Potentially large market

The market for off-loading CICS programming and testing to micros is a potentially large one. Koc claimed that CICS is represented in more than half of all IBM sites using an interactive programming environment on their mainframes. According to Tom Roberts, an analyst at International Data Corp. (IDC) in Framingham, Mass., however, there might be some hitches.

Roberts said the installed base of PC XT/370s and PC AT/370s is limited to begin with, estimated at about 9,700 in the U.S. and not climbing at any great pace. On the other hand, Roberts said, the CICS off-load market might be stalled by the limited power of PCs. "The [Intel Corp.] 80386-based machine that IBM will come out with should make a difference," Roberts explained. "That will be able to run VM, IBM's subset of CICS. That will open the market."

"The problem behind the slow sales of the PC 370 [line] is the failure behind its initial implementation," explained Michael Scroggie, president of Unicorn. "It doesn't have enough horsepower, and IBM still doesn't provide VSAM on the 370, which, with CICS, is one of the most critical IBM programming support environments today."

Scroggie said that is about to change, however.

"IBM's strategy is to get VM/SP, an extension of VM/CMS, across its product lines," he said. "IBM's new Micro370, which will include VM/SP, is going to change the PC CICS market dramatically." (IBM introduced the Micro370 in early October, as part of its 9370 line of departmental computers.)

And that market, Scroggie maintained, is going to be a big one. "There are probably about 12,000 CICS installations in the U.S. today," he said. "That's one market. Another market consists of software developers who don't want to invest in a mainframe to develop CICS programs. Also, more and more hardware companies are trying to penetrate IBM's share of the corporate computer market by offering CICS compatibility. In that sense, CICS is becoming like [IBM's Systems Network Architecture]."

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CIRCLE READER SERVICE NUMBER 119

MICROCOMPUTER NEWS

IBM, HP Gear Up To Assault Desktop Publishing Market

The Apple Computer, Inc. Macintosh and Pagemaker from Seattle-based Aldus Corp. have epitomized desktop publishing. In fact, at the low end of the electronic publishing spectrum, the Mac has been without competition. But the Apple computer now faces real competition from IBM and potential competition from Hewlett-Packard Co.

Until recently, the IBM Personal Computer and compatibles have not had available low-cost page composition software. That situation changed at the Seybold Seminars' Desktop Publishing Conference in September. The San Francisco conference brought a rash of application announcements that make the IBM PC and compatibles viable competitors in the desktop publishing market.

Page composition software announcements for the IBM PC included Pagebuilder from White Sciences, Inc. in Tempe, Ariz; The Office Publisher and The Office Publisher Plus from Laser Friendly, Inc. of Toronto; First Impression from Megahaus Corp. in San Diego; Pagemaker for the PC from Aldus; and Ventura Publisher Edition from Xerox Corp. in El Segundo, Calif.

Aldus announced a version of Pagemaker that runs on the IBM Personal Computer XT and AT. Running under Microsoft Corp.'s Windows, Pagemaker for the PC offers 20 added features, including automatic dictionary-based hyphenation and kerning, which are also incorporated into Version 2.0 for the Macintosh.

Wait, there's more

Xerox has begun marketing a desktop publishing package for IBM PC XTs, ATs and compatibles that it acquired from Ventura Software, Inc.

Called Ventura Publisher Edition, the software includes a drawing tool set, manual kerning, word spacing, increased hyphenation and justification capabilities and more extensive support for printers, phototypesetters, design file formats and displays. Xerox has modified its own 6065 personal computer so that it will run the Ventura software as well.

Ventura Publisher on the XT or AT potentially may have the greatest impact on the Macintosh running Pagemaker, according to Jose Ramos, publisher of "WYSIWYG," a monthly newsletter on the computer-aided publishing market.

"Ventura is a true what-you-see-is-what-you-get package," Ramos said. "As you start typing, it hyphenates and justifies the copy automatically." The copy can also fill in formatted columns as the user enters text. "When you're done, there's no question about the copy fitting."

Using a Macintosh, Ramos explained, users generally enter their text with a word processing package first. Then they merge the page layout file in Pagemaker with their text file. "It's too slow if you type directly into Pagemaker," he explained, "and if you use it too much, it messes up the program."

With the availability of several composition packages, IBM will be able to use its installed base of PCs and its marketing forces to grab a piece of Apple's desktop publishing pie.

HP can potentially cut into the Mac's market as well, according to Ramos. Many users purchase Macintoshes because they want Apple Laserwriters. Even though other computers can connect to the Laserwriter, it serves as a foot in the door for the Mac, Ramos explained. However, HP has 67% of the laser printer market, he said.

The large installed base of printers, Ramos asserted, puts HP in a better position than Apple to do desktop publishing. Additionally, HP recently adopted the Document Description Language, one of the two most widely used typesetting command languages. Finally, HP's IBM-compatible machine can take advantage of such document composition as Xerox's Ventura Publisher.

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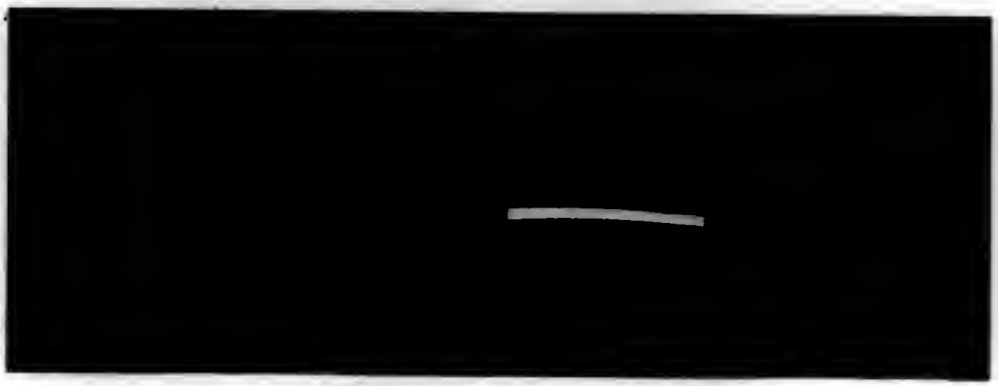

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CIRCLE READER SERVICE NUMBER 132

MICROCOMPUTER NEWS

University Study Aims To Combat Users' Fear Of Computers

Cyberphobia *n*: the fear of computers.

The symptoms of cyberphobia start as soon as you sit in front of a computer screen: You begin to break out into a cold sweat, nausea and stomachaches.

According to Sandy Weinberg, an associate professor at Drexel University in Philadelphia and president of consulting company Weinberg Associates, up to one-third of U.S. workers experience symptoms of cyberphobia.

Help might be on the way for sufferers, however.

Weinberg first got involved in studying the fear of computers eight years ago when he was a faculty member at the University of Connecticut's Innovative Education program.

'Make computers easier'

"We were approached by computer companies who wanted to know how they could make computers easier to use," Weinberg explained. "Making documentation and manuals clearer was one way, but the major problem was in improving user interfaces."

Weinberg said that research helped lead to the innovative graphics user interface in Apple Computer, Inc.'s Macintosh microcomputer.

There are now 10,000 Macintosh computers at Drexel, making it one of the most "wired" universities in the U.S.

Develops software for Apple

"Drexel has been one of the major software developers for Apple Computer," Weinberg declared.

"We got involved at the early design stage with the Macintosh. The whole idea was to make the computer as easy as possible to use, while making it unique," he explained.

Weinberg said the Macintosh is a successful example of creating the right kind of interface for users to learn easily, although, he claimed, not enough is being done yet in the industry to address the problem.

"The big problem is that the urge to create better user interfaces is not coming from the computer companies but from the value-added resellers," Weinberg said.

"Most [computer] manufacturers are oblivious to the problems of users. However, it's not entirely their fault. Vendors are often getting some unrealistic expectations from users," according to Weinberg.

Site of major study

Drexel has been making some other computer news. The university is now in the fourth year of a five-year study of how computers are affecting attitudes, values and life-styles.

Dr. Joan McCord, one of the study coordinators, said that the university's study can act as a sort of microcosm for the experiences of computer users in general.

Some of the study conclusions to date include the following:

- Computing appears to have no influence on students' desires to establish relationships with other people.
- Students who were the most frequent users of computers were those most likely to value variety and learning.
- Women continue to lag behind men in their interest in and use of computers. (McCord offered her opinion about how women can turn this finding around. She said that "unless women avail themselves of opportunities to become comfortable with computers, they may find themselves falling further behind in occupational competition.")
- Computer crime is considered far less glamorous by students than one would first expect.

News section compiled by Rebecca Hurst and Stan Kolodziej, Computerworld Focus *senior writers.*

CIRCLE READER SERVICE NUMBER 126

BUYING TRENDS

MIS Cuts Back On Micros

·BY·STAN·KOLODZIEJ·

After a personal computer purchasing spree, firms are now reassessing their needs and tightening their purse strings.

Finding a common theme can help penetrate a mystery, and the computer industry is no exception. Most MIS departments have used 1986 to take a hard look at microcomputers. Purchasing plans are being cut back; so are user expectations.

"Companies have entered a period of reflection," explains Leon Jackson, manager of office automation at Arthur D. Little, Inc. in Cambridge, Mass. "There will be no micro orgy for awhile. MIS has decided it's time to deal with the problems they missed first time around."

And the problems are many. Saturation is a major one. "Our PC purchases have leveled off because those departments that had applications requirements last year have been filled," explains Ronald Bleiberg, manager of advanced office systems for Emery Worldwide, located in Wilton, Conn. "The few PCs we purchased this year were for some additional applications."

The problem can also be organizational. "PCs were basically banned here for awhile because our mainframe people wanted control," says Virgil Broering, vice-president of MIS and corporate distribution at Rayovac Corp. in Madison, Wis. "We're still trying to catch up."

The problem could be financial. The economic situation for many U.S. industries is still poor, and for some major industries, it is positively grim.

"Everything that we do is related to the oil industry," says Ollie Ohnstad, information systems manager at Denver-based Hamilton Brothers Oil Co. "PC purchases, like the oil industry in general, are on hold."

On a more global basis, Arthur D. Little's Jackson claims, many corporations are retrenching with PCs because of a general reflex action taken recently by MIS to put the brakes on what it perceives to be an irresponsible rash of PC buying by corporate departments.

"Local purchasing [in corporations] is still being done," Jackson explains, "but the trend is definitely toward a more central and standardized approach with hardware and software purchases. What MIS had given with one hand, it has taken back with the other. Ironically, it was MIS that first gave local users the original go-ahead on PC purchases.

"IBM has been successful in convincing everyone that it is the only one that can service all of these PCs. Of course that's not true, but that myth is being guided by MIS," he maintains.

Jackson's point is borne out in the responses of MIS people contacted by *Computerworld Focus*. The materials management department at Cleveland-based Standard Oil Co., for example, was formed as a conduit to channel corporate PC purchases through a sieve of MIS-imposed IBM PC hardware and software standards.

A spokeswoman for the company says that an earlier information center concept at the company got out of hand with too many product purchases. MIS stepped in to provide some control.

Ohnstad says that what started out as a company policy at Hamilton Brothers to delegate PC purchasing to the departmental level eventually led to MIS stepping in and taking control.

"We weren't looking at MIS controlling the [PC] purchasing, even in the earlier years," Ohnstad explains. "The users, however, were exceeding what they could do, so they wound up approaching us for help. I don't think that's such an unusual occurrence."

Broering says his company has standardized on a few software products because they have been proven reliable during the years. Emery's Bleiberg says PC products at his firm have to fit into the overall IBM environment.

J. R. Leatherman, manager of information services at Hughes Tool Co., headquartered in Houston, says that his company has cut back on PC purchases and standardized on a few established hardware and software products. "It's as much organization as it is economics driven," he explains. "I've met a lot of other MIS people who are consolidating and trying to get more mileage out of what they have."

In a sense, the heavy hand of

BUYING TRENDS

MIS over corporate PC purchases has become more prevalent in the past two years. In early 1985, International Data Corp. (IDC), a Framingham, Mass.-based research firm, issued a report on U.S. microcomputer-buying patterns and stated unequivocally that "in large firms, the word of the MIS department is law in many cases. . . . For the larger companies, winning the hearts and minds of the MIS group is critical to [microcomputer vendor] success."

This increased MIS sway over PC purchases is going hand in hand with another trend — the focus on fewer established products, something which can only contract the PC vendor market even further, slowing sales.

This tendency is substantiated by a recent MIS survey commissioned by Honeywell, Inc. and carried out by Cambridge, Mass.-based research group Hammer and Co.

Hammer found that in almost 90% of the responding companies, 75% or more of new computer equipment, including microcomputers, in 1986 to 1987 will come from approved vendors. The study reasons that an approved-vendor list has arrived and that MIS uses it extensively in selecting PC systems. MIS respondents in the study also expressed a reluctance to have to deal with new vendors, expecting approved-vendor lists to remain static for the next two years.

There is evidence that the popularity of such MIS-driven lists is having a negative effect on the micro retail industry. A recent study of the PC dealer and distributor market undertaken by Computer Intelligence Corp. in La Jolla, Calif., indicates that the recent slump in the computer industry has taken a larger than expected toll among the dealers and distributors of microcomputer hardware and software.

Computer Intelligence's research reveals a 7% decrease in the number of U.S. micro distribution outlets during the past year. California and Texas, which account for nearly 25% of all U.S. micro dealers and distributors, lost more than 200 outlets in 1985. The micro retail industry is in a period of consolidation, aggravated by vendor lists that curtail product variety and retail expansion.

Legions of PC clones

The micro industry could be in even worse shape, but much of the market slack is being taken up by the legions of IBM PC clones that have appeared on the market in 1986 and have provided a mini PC boom by pushing low-end prices to new limits.

What these low-priced clones have done, through price incentives and surprising reliability, is turn the approved-vendor list concept on its head. Many companies that had turned a blind eye toward higher price IBM PC compatibles as part of the approved-vendor list are opening their back doors to clones.

Ironically, as more corporations become conservative and wary of PC purchases, there is a growing countermovement afoot to throw service, caution and brand names to the winds and place more low-cost clones in staid corporate settings. However, IBM should not loosen any of its PC stranglehold on the Fortune 500 market in 1987, according to IDC.

"We had more problems with the IBM PCs a few years ago than we've had with our PC's Limited clones," Broering claims. "There are good deals out there if you look. If we buy a standard IBM PC and get a 20M-byte hard card, it would still be 25% to 30% more than clone prices. We don't buy machines unless they can use 20M-byte disks and have 640K bytes of core memory, and in that range, you're looking at 50% to 100% more for IBM machines.

"Don't let IBM worry you about the service end," Broering adds. "The service part can put the price of PCs up even more. You can get the clones serviced properly if you go with a good vendor. We stay with IBM micros in Europe because there is little alternative servicing for most other machines. Here you can get everything at rock-bottom prices."

"It's happening throughout the industry," Bleiberg says. "More companies are looking for bells and whistles with microcomputers and software at the high PC end. At the low end, price is becoming a driving factor behind the purchase of stand-alone PCs. Companies are worrying about getting local-area networks into place, and if a PC clone can be plugged into a network without compatibility problems, then it brings the per-node costs of the network down."

As for the hope that the rash of Intel Corp. 80386-based micros, expected to start appearing in early 1987, might inject some energy in the flagging micro market, expectations might be running ahead of reality. Broering expresses an opinion about the new 32-bit machines that seems to strike a common chord among MIS departments.

"We're not going to be looking too closely at the 386 machines for awhile, and why should we?" Broering says. "I

> *What these low-priced clones have done, through price incentives and surprising reliability, is turn the approved-vendor list concept on its head.*

BUYING TRENDS

think most corporations like us are trying to reach that balance of getting more quality for cheaper prices.

"MIS is shopping around. You can get good deals out there now, and I'm not speaking strictly of micros. We looked at the IBM 3090 models and found we could get a better deal with the IBM 3081 Model D mainframe. It still gives us the raw, crunching power we need, it runs DOS, and we got a lot more than if we hadn't negotiated," he says.

Broering insists the same thing applies to the micro market.

"We're looking at cheap IBM Personal Computer AT compatibles. The [Intel] 80286-based machines are going to come down further in price. With add-ons, the 286s approach the same power as the 386s. When the 386 vendors come out with Microsoft Corp. MS-DOS beyond the 640K-byte limit, maybe. Until then, you can do better elsewhere."

Omstad says that they are not ready for the 386 machines at Hamilton Brothers. "We're keeping an open mind," he says, "but it seems like too much clout for our needs."

Emery's Bleiberg was one of the few dissenting voices, calling the 386 machines "the biggest enhancement to PCs in a long time. We could do coprocessing with the mainframe without having to bother with queues, we could do effective windowing, concurrent processing, and we could plug into the Unix environment.

"We've been expecting something like the 386 machines for a couple of years. Through leasing agreements we've been able to upgrade our PCs and keep current with technology. This method has also left our window open for the 386 micros," Bleiberg notes.

Beyond this, Jackson says, MIS has compiled a list of grievances that he claims vendors have to address before they make wholesale purchases.

"Integration has to be at the top of the list," Jackson explains. "PCs are no longer stand-alone. MIS wants these things connected. They look at local-area networks (LAN), but they are confused — networks need file servers, and they need new operating systems, and they can't plug into things like [the IBM Professional Office System]. Many have seen how limited PC-to-mainframe links are.

"At one end, MIS, which tends to get fascinated by technology, got excited about the Intel 80386 machines, but they see little multitasking, multiuser software yet. At the other end, a lot of companies have standardized on IBM PC ATs, and MIS knows that their users haven't yet used the full potential of IBM Personal Computer XTs.

"The 386 machines are looking like something ahead of their time. Taking these PCs from a stand-alone mode has been far more difficult than people first thought," Jackson says.

The Hammer study indicates a litany of MIS dissatisfaction behind the problems installing departmental systems in the 1986 to 1988 time frame.

Among the barriers to integration that respondents listed are inadequate integration of PCs with minicomputers; shortcomings of local-area network technology; inadequate facilities for connectivity; economics of departmental systems, especially of LANs; and problems of user management of departmental systems.

The study concludes that "integration and communications are the issues of greatest concern to customers and that both MIS and users had significant concerns about users' abilities to manage departmental systems."

LANs as the path of the future

In spite of such apparent dissatisfaction, many MIS people contacted by *Computerworld Focus* expressed confidence in LANs as the integrated path of the future.

Phyllis Mlady of the corporate purchasing department at Standard Oil says that LANs have been emerging gradually within the company in tandem with a PC growth path from the middle, professional ranks into the executive and clerical levels.

"The employees who first started using PCs, the middle tier of professionals, have been pretty well saturated with PCs," Mlady explains.

"Now, the demand is coming from executives and clerical workers. To me, that seems like a natural PC progression in large companies. Once you reach a saturation level, you start thinking about connectivity and about LANs. We only have a few isolated networks in place now, but more will be gradually installed within the middle user ranks," she says.

"As the other users reach a certain level of PC use," Mlady adds, "they'll be brought into the network fold. You can't keep executives on PC-to-mainframe links forever. Eventually there has to be more integration on a distributed, corporatewide basis, and the logical step is toward networking. I guess it depends on the philosophy of the company. Ours is definitely toward distributed computing and a Digital Equipment Corp. environment, away from IBM."

The software concern

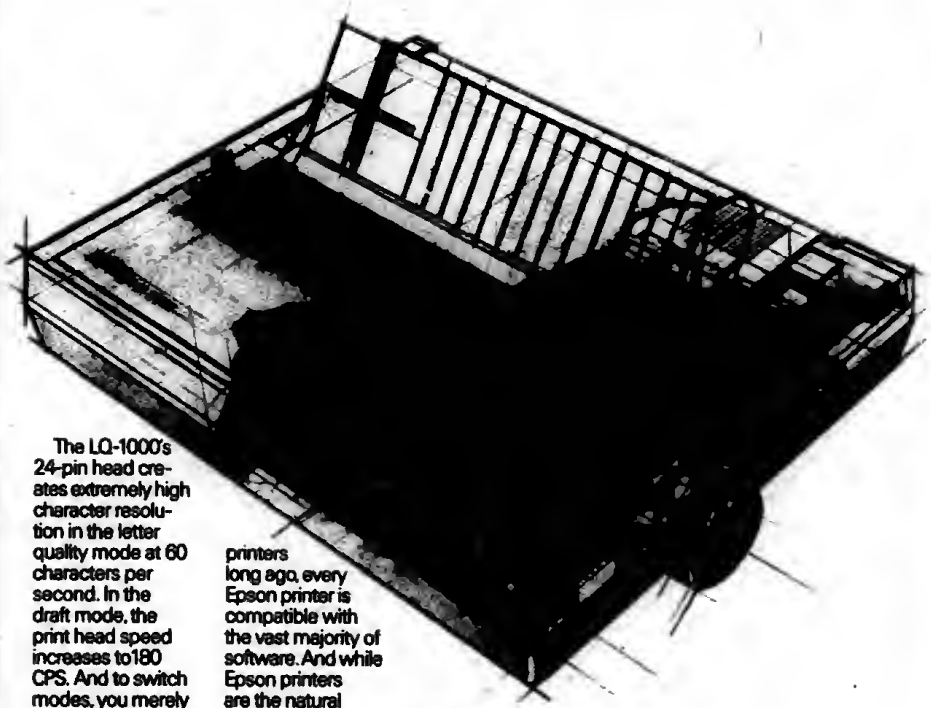
Arthur D. Little's Jackson lists software as another major concern with MIS. The fact is, he claims, most of the established software programs like Lotus Development Corp. 1-2-3 are still difficult to learn for the average user.

Until there is a quantum leap in user friendliness, he says, the built-in barriers to sales will remain.

"I don't think we can be pessimistic about the PC industry," Jackson concludes. "It's still very strong in comparison with other industries. It's just a tougher sell with MIS."

Kolodziej is a Computerworld Focus *senior writer.*

THE GLORY.



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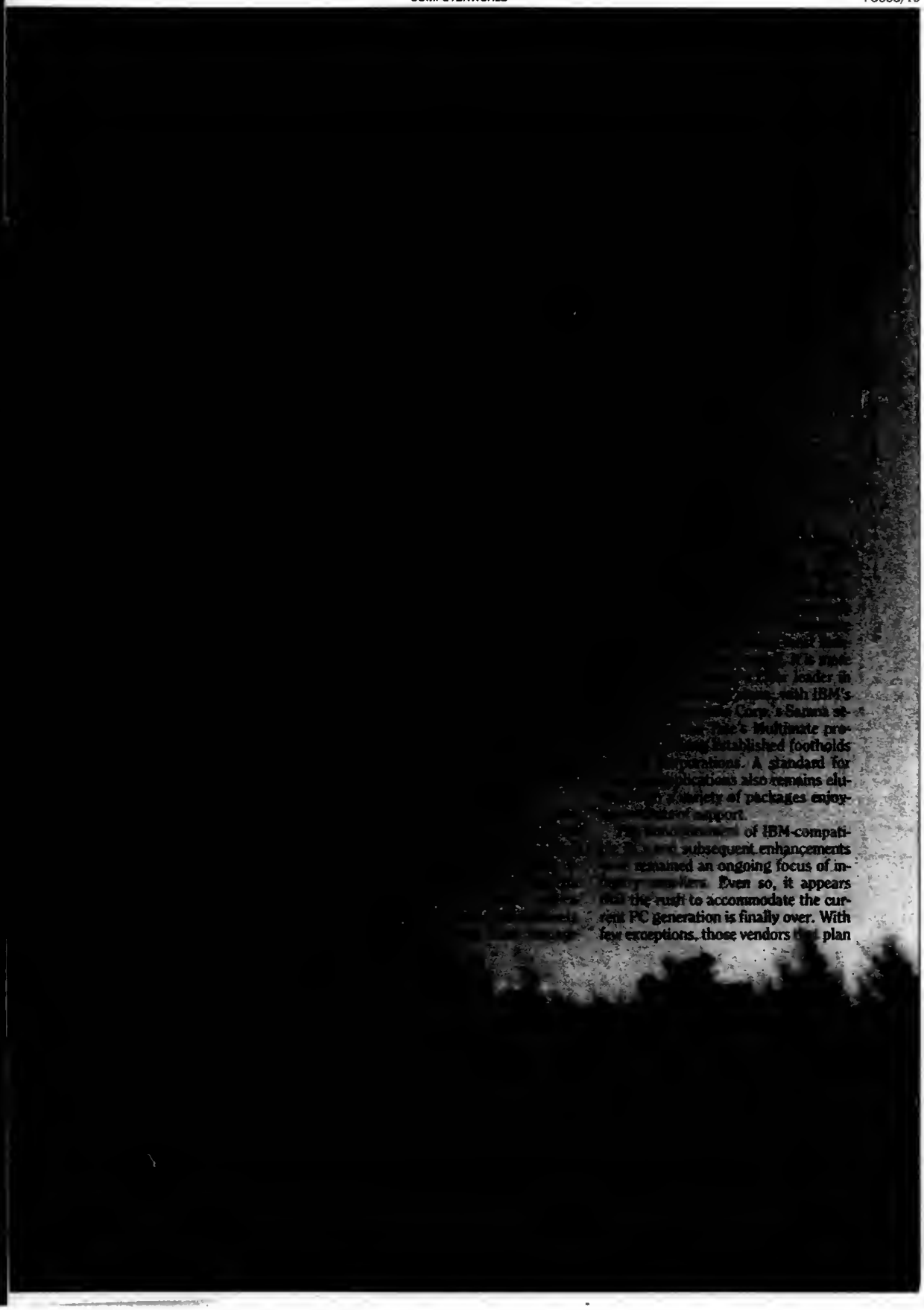

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to offer a PC have already done so, and activities appear to be focused primarily on enhancing existing offerings, rather than on providing new solutions.

Fundamental changes in the PC market suggest that user organizations and MIS will soon face critical decisions. First is the decision regarding the PC vendors of choice. Although IBM continues to lead as the preferred PC supplier within the Fortune 500, compatible and clone systems have made significant inroads in markets within the past two years. The robust profit margins PC suppliers once enjoyed, however, are now virtually nonexistent, and many vendors have either shut their doors or are scrambling into other markets in a quest for corporate survival.

Thus, user choices are now dwindling from a glut of PC suppliers in 1984 to a survivable few. Of those that remain, the winners will be companies that have already established a large and loyal installed base or offer PCs within the context of larger computer strategies. The losers — and there will be many — will be PC suppliers that have relied exclusively on price or that have not sufficiently diversified to survive the commodity war developing between IBM and its offshore competitors.

The proliferation of PCs in corporate America represents a mixed blessing at best. The PC has provided significant benefits to organizations by revolutionizing the way most companies do business. On the other hand, uncontrolled growth and a lack of concrete strategies for the future has created an ongoing set of problems outlined below:

■ Lack of training and support.

The proliferation of PCs, multiplicity of software packages and lack of a common user interface has created a growing demand for end-user training and support that is outstripping the capabilities of most organizations. Faced with inadequate training and support from system suppliers, management is concerned about improperly used and unused PCs, an overall loss of productivity and the specter of inaccurate management decisions being made based on incorrect or inadequately developed information.

■ Software costs and risks.

PC software has become an unmanageable burden in many organizations. Single-user software licenses are too expensive when viewed at the organizational level; management of software upgrades on an individual basis is difficult and time consuming. Concerns regarding corporate liability for employee piracy of copyrighted software are increasing.

■ Networking problems.

Initial attempts to interconnect PCs illustrate that connectivity is more expensive than first perceived. Because of the lack of comprehensive local-area networking solutions from major computer suppliers, users have implemented mix-and-match strategies that rely on using many third-party suppliers. This has introduced a crowd of unrelated vendors into an already complex computing environment.

■ Limited integration.

PC integration has been limited to using departmental systems as disk servers and reducing end-user access to information stored at larger systems to basic terminal emulation. Data created under different PC software programs still remains incompatible with each other and, more importantly, with information resident at departmental hosts and corporate mainframes.

■ Security.

As PCs proliferate and more users want access to more data, MIS and corporate management are becoming concerned with the security of PC data.

A review of the 1987 buying plans of major U.S. companies by Tempe, Ariz.-based Sierra Group indicates that the personal computer will again lead corporate purchasing increases in 1987 — in many cases, by a factor of two to one. Faced with a demand seemingly without end, vendor strategies continue to revolve around the PC and are also moving in several other directions.

To capture an installed base estimated to be in excess of five million users, industry suppliers are now focusing on providing tighter integration of the PC with-

> *MIS managers are voting a resounding no to establishing the Intel Corp. 80386 as a corporate standard any time in the future, primarily because of price and a variety of concerns focused on compatibility with existing PC systems.*

in larger computing environments. In 1986, most PC vendors played a waiting game — offering a little site licensing here, a little more data conversion there.

In 1987, however, the integration game promises to heat up. For PC software fans, versions of industry-standard PC software designed for departmental minicomputers will provide the ability to integrate stand-alone PCs in a cost-effective manner while salvaging an existing base of PC-generated data.

Owners of integrated office systems will also see enhanced support for their strategies via full-featured versions of popular integrated office packages at the PC level and significant new connections between departmental office systems and PCs. At the same time, a renaissance in windowing environments will emerge across the industry, supported by a roster of suppliers that reads like the industry's who's who. Of the heirs apparent, Microsoft Corp.'s Windows appears to be the favored choice as the industry's next major de facto standard in this area — a move that may also set the stage for Microsoft's Enable to emerge as a powerhouse in the integrated office software arena.

As users benefit from a new generation of PC software and enhanced networking links to support virtually any corporate strategy, new renditions of existing PC technologies will also emerge to solve many existing problems. Key to these will be a roster of upgrades and options for existing PCs that will boost their performance while providing compatibility with another generation of software.

At the low end, new, medialess PCs will provide low-cost access to network servers, address software piracy problems and resolve data security issues. A desktop PC that incorporates a laptop PC within the desktop chassis is also on the drawing board. This machine reportedly will offer users the best of both worlds but not at double the price.

Although it appears that the primary focus in 1987 will be on enhancing existing PCs and furthering integration, it is clear that some hardy (or perhaps foolhardy) vendors will opt to lead the race to provide users with a new, more pricey PC. The Sierra Group review of current 1987 buying plans illustrates that MIS managers are voting a resounding no to establishing the Intel Corp. 80386 as a corporate standard any time in the future, primarily because of price and a variety of concerns focused on compatibility with existing PC systems.

However, there does appear to be a burgeoning demand for innovative and faster PCs in places where computer integrated manufacturing is a strategy or where artificial intelligence will play a role in MIS business plans. For the short-term then, and barring proprietary versions from several key industry suppliers, it appears that 1987 will not be the year of a general-purpose PC III.

To set the stage for the future, MIS challenges will lie in focusing less on the PC as a maverick technology demanded by islands of users and more on a broader strategy that views the PC as the corporation's profession-specific workstation of choice. This change in focus will require the development of PC strategies that go beyond selecting a few primary PC and local-area networking suppliers or standardizing on one or two PC software programs.

To assure that existing and future PC investments will fit into the longer term corporate landscape requires a concurrent top-down and bottom-up assessment of the PC's current role in the organization and a long-term strategy to harness its potential as a fundamental component of the corporation's computing and communications environment.

[This article is based on information contained in two recently published Sierra Group reports and analysis of information contained in the Sierra1000 Data Base, an information data base that tracks the 1987 buying plans of major U.S. companies.]

Gruhn is a vice-president of the Sierra Group, a marketing research and consulting firm based in Tempe, Ariz., that specializes in tracking end-user requirements and vendor strategies in the information processing industry.

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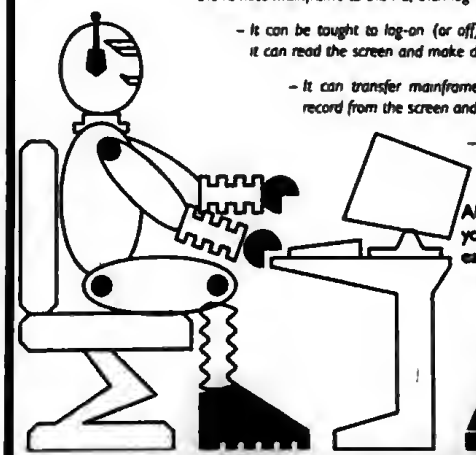

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CIRCLE READER SERVICE NUMBER 120

386 REPORT

• BY • AARON • GOLDBERG •

After a well-orchestrated buildup, products using the latest Intel Corp. microprocessor, the 80386, are now on the scene. At first, one might be tempted to say that these machines are nothing more than more powerful IBM Personal Computer ATs — Turbo ATs. Technically, this assessment is correct. But, hiding under the sheet metal is a single component that will likely change the way MIS departments and information systems professionals view personal computing. Unfortunately, this impact is still a way off.

The Intel 80386 is the basis for a significant change in end-user computing. Even IBM has sanctioned the product; the firm recently announced that it will customize the 386 for its own use. This move is expected to have implications far beyond the IBM Personal Computer line.

So what is it that the 386 can do that will make it such a profound product? Is it another rendition of the Intel 80286, whose time has come (and, some argue, gone)? If the chip has great innate capabilities, then why do 386-based products seem to have few new capabilities?

To answer these questions is not simple. The major issues are fairly straightforward, however. First, the 386 is the first microprocessor that has full 32-bit data and memory paths. Hence, the processor is less a victim of poor hardware design than other microprocessor-based systems. It also means that huge memory-addressing capabilities are available.

Second, the 386 supports virtual memory. Remember back to the early days of computing and think about the new applications and tasks that virtual memory capability opened up.

Third, the 386 supports a type of virtual machine capability that, although not truly like IBM's VM, is very useful indeed.

Lastly, Intel claims that the 386 is a processor that operates at 4 million instructions per second (MIPS) in a 32-bit environment. Systems in the $1,500- to $2,000-per-MIPS range definitely create some differences in processing cost between small and large systems.

Now, how will this change the world for the user of information systems? The following are four issues that will impact users, and these focus on a number of diverse management concerns:

- The issue of common operating environments and interfaces, including applications commonality across multiple product sets.
- The issue of elevating the stature of PCs from that of standalone, work-alone machines to systems commanding true host/departmental system leverage.
- The issue of PC migration and what the future personal application set will look like.
- The issue of how the disbursement of this level of processing power and the attendant data will affect the position of the line manager and MIS with regard to future roles.

The 386 is the first chance for achieving the same, or at least functionally similar, operating environments across multiple system types. IBM's Micro370 announcement will cause VM to be downsized to a new and different set of markets. It is not inconceivable that at some future point in time a VM type of environment would be supported on the IBM "PC 386." With 4 MIPS of power and 8M to 16M bytes of memory, many applications could be run locally instead of on the host.

The concern with end-user interfaces is one that has certainly captured IBM's attention. IBM has publicly stated that it would like to have the same interface on multiple families of hardware. The 386 provides enough for the basic

hardware platform to make this possible.

However, this change in capability and environment will create a number of problems and issues for MIS. Clearly, there will be only a small number of users that will find success in both the personal application environment as well as the connected environment that a common operating system would bring.

This multiplies the forms and types of end-user computing, making a barely manageable issue even more difficult. In fact, implementing this concept in a departmental-type approach, in which applications and support can be tailored to the installation, may be necessary. Ad hoc implementation of a complex environment cannot be allowed.

This may be the strongest case for departmental computing. By using a minicomputer-class system as a facility to streamline some of the system management chores, end users will likely be more successful and productive.

Managing end-user resources

In addition, MIS departments will use the departmental processor as the focal point for managing end-user resources and environments. It cannot be expected that end-user departments, no matter how well trained, be burdened with the system administration functions that go with using either a mini- or superminiclass processor.

There is another, more fundamental concern. Until now, personal computing for the most part has dealt with individual data and applications. A 386-based system will be on the forefront of connectivity due to its ability to run more complex operating systems as well as the evolution of integration tools that should be complete enough at this point to be of true utility.

This desire, generated by users at some organizations and by MIS at others, will lead to an entirely new range of problems that have not yet been encountered in personal computing. However, the good news is that many of the lessons learned in other end-user computing scenarios can be applied here. This is especially true with regard to security.

Interoperability standards needed

Managing a highly integrated environment will necessitate the use of interoperability standards such as IBM's Document Interchange Architecture. The expectation of many MIS managers that single-application products or even standard application sets can be maintained will create user backlash. Rather, the focus should be on the products that are designed with large or departmental integration in mind.

The data base area will also see announcements this fall in which PC data base tools will extract IBM's IMS and DB2 and Cullinet Software, Inc.'s IDMS files for use in the PC. IBM SQL conversion is just around the corner.

The reason that the 80386 is so crucial is because of the complexity of actually providing this conversion functionality. As anyone familiar with the requirements of file conversion knows, doing major conversions in real time is CPU intensive and beyond the reach of the Intel 8088 and possibly the 80286.

The basic design of the 386, which facilitates the execution of multiple tasks, gives the system designers a far better base on which to build. One of the problems of the personal computer today is that it is only a single-task system. End users operate in a highly interrupt-driven environment, and having workstations that move at best in a cumbersome manner among applications is unacceptable. There are some applications, like Quarterdeck Office Systems, Inc. Desqview, which offer multitasking capability, but the 386 will provide the native-mode capability that helps true multitasking prosper.

Even more important than multiple DOS sessions is the ability to run multiple operating environments on the 386. Although initially this capability will not be introduced, later versions should provide a VM-like environment.

Intel officials have stated that it is possible to have IBM PC-DOS, Unix and even proprietary operating systems running simultaneously on the 386. This level of ability should provide some exciting applications and an integration capability, but the software is a long way off.

The effect of the 386 on MIS? MIS will have to take a new view on the cost equation of the various system types that they use. At this point, the issue of downsizing, or running applications on the smallest possible system, is a reality. The 386-based systems will also provide platforms for execution of query, manipulation and presentation of information. The applicability of the low-end, 386-based units for transaction-based systems does not look good at this time, but the issue is the software and operating environment, not processing power.

The 386 is the catalyst for a major change in the use and management of personal computing. Of even greater importance to the user of information systems is the fundamental change in the nature of end-user computing and, eventually, all computing, that will start to occur in the next 12 months.

Many MIS organizations were caught a bit unaware by the initial thrust of the personal computer, but this time around that should not be the case. Planning for and maximizing the return from the next generation of technology will go a long way to achieving top management's goal of information systems providing the competitive edge that is so desirable and necessary.

Goldberg is vice-president of Microcomputer Services at International Data Corp., a market research firm based in Framingham, Mass. He has developed strategic implementation plans for end users.

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VENDOR SPOTLIGHT

Apple Plugs Into IBM's Market

• BY • REBECCA • HURST •

It's fun. It's innovative. It's educational. But it is not a *business* machine.

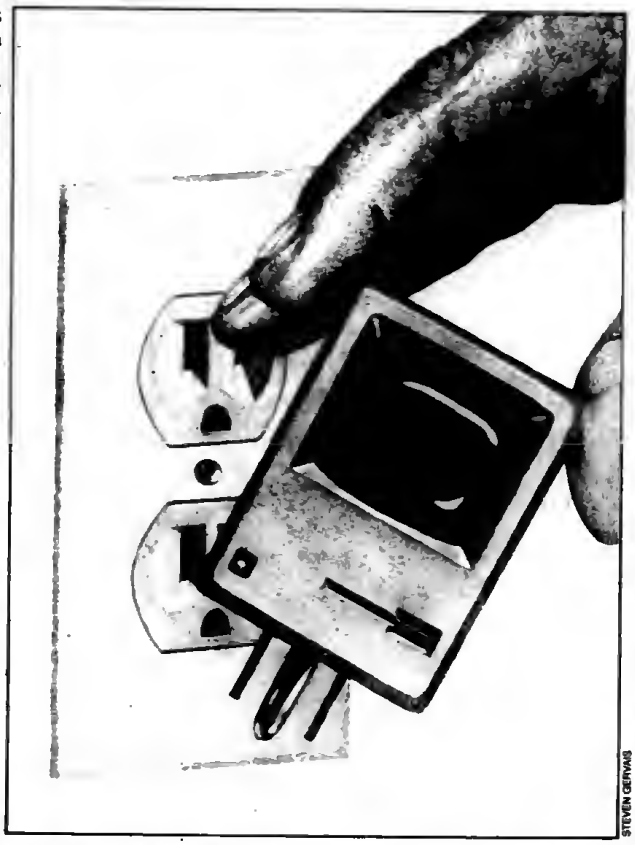
That has been the opinion of many business and industry analysts about the Apple Computer, Inc. Macintosh personal computer, but that opinion is changing. Macintoshes, long dubbed inappropriate for the office, have been quietly making their way into a variety of companies, including Fortune 500 firms.

The acceptance of the Mac in the corporate environment has been an uphill struggle, says David Goodstein, president of consulting firm Interconsult, Inc. Many companies already have a large installed base of IBM Personal Computers. These users are more likely to add extra PCs or clones because the Macintosh is not compatible and does not demonstrate a clear overall advantage over the IBM PC.

One area of debate is the issue of ease of use vs. versatility, particularly regarding interfaces, according to Michael Goulde, a market analyst for the Yankee Group, a Boston-based consulting firm. Only a handful of applications are written to the Microsoft Corp. Windows software that runs on the PC. Almost all applications for the Macintosh adhere to Apple's interface. "Once you learn to use one application, the learning curve is drastically reduced," Goulde says.

However, the problem with Apple's interface, Goodstein notes, is that it does not allow users' level of use to progress. "You can learn it in 10 minutes, but in 10 years, you won't get any better," he says.

Several market analysts, noting the lack of versatility and corporate interest, were unconvinced that the Macintosh could compete with the IBM PC as a business system. Then Apple introduced the Laserwriter, capitalizing on the Mac's strength in the graphics area, an area in which the Mac surpasses the IBM PC. Analysts say they believe that the Macintosh, combined with Aldus Corp.'s Pagemaker layout software and Apple's laser printer, has a place in the office as a low-cost publishing solution.



STEVEN GERWAS

Business users interviewed by *Computerworld Focus* all owned Laserwriters, but that was not the primary reason they bought Macintoshes. They cite ease of use, connectivity and the need for graphics-oriented applications as the most important decision factors. Moreover, while most of the users ranked ease of use as the No. 1 concern, communications with other computer systems was the common requirement among all the companies. For the Seafirst Bank, John Deere Dubuque Works and E. R. Squibb & Sons, Inc., connectivity has been an integral part of their Macintosh systems. For The Prudential Insurance Company of America and The Western Industrial Bank, connectivity eventually became a necessity.

At the Seafirst Bank in Seattle, where Macintoshes serve as a lower cost/higher intelligence alternatives to IBM 3270 series terminals, connectivity is a given. The bank has approximately 2,000 Macintosh 512 and 512 Plus computers outfitted with Applelink protocol converter boards that allow the bank to link its IBM 3084 and 3081 mainframes through a statewide IBM network. Everything is switched through the IBM host computers, notes Tim Turnpaugh, senior vice-president and manager of technical services at Seafirst. Employees also use applications written for the Mac on a stand-alone basis.

The emphasis on connectivity is different at John Deere Dubuque Works, an Iowa-based division of Deere & Co., but it is equally important. "Communications among systems is critical," says Doug Foster, a systems engineer at Deere.

The division, which designs farm and construction equipment, uses Macintosh 512s with internal drives as low-cost engineering workstations, he explains, but different groups within the division need to share data. Additionally, the division has to exchange information with the company's central host computers.

Because users must communicate with two vendors' mainframes, Deere uses two programs.

VENDOR SPOTLIGHT

For the on-site Tandem Computers, Inc. Nonstop TXP, Deere uses Menlo Business Systems, Inc. Mac Menlo, a Tandem 6530 terminal emulation package. To communicate with the IBM 3081 and 3083 mainframes and Tandem TXPs at company headquarters, Deere uses Tri-Data's Netway 1000A Appletalk Gateway, which is a combination of hardware and software that acts as a 3270 controller. Users at Deere also allow their Macintoshes to communicate with the company's Digital Equipment Corp. machines through RS-232 connections.

Medical research use

At the Squibb Institute for Medical Research in Lawrenceville, N.J., researchers also use the Mac as both a workstation and a terminal. In designing pharmaceuticals, senior scientists use Macintosh 512s with a General Computer Co. Hyperdrive 20 disk drive to draw chemical compounds and integrate them with graphs and text. However, they use a DEC VAX-11/750 for the actual molecular design.

To access the VAX, Squibb supplies each Mac with Peripherals, Computers & Supplies, Inc.'s Versaterm Pro, which emulates a Tektronix, Inc. 4105 graphics terminal, among others. The choice of Versaterm Pro was in response to the molecular design software's demand for a 4105-type terminal, explains Peter Sprague, director of the department of chemistry/cardiopulmonary agents.

Submitted by Alan Hopkins

"[Using a Mac] has allowed us to cut dramatically the time it takes to bring a new product to the line."

— Doug Foster
John Deere Dubuque Works

For two companies, The Western Industrial Bank and Prudential Insurance Company of America, connectivity with other vendors' computers was not an issue at first. Their communications were limited to other Macintoshes. As their needs grew, however, users found that they needed to access data from larger systems.

Western Industrial, a one-branch bank located in Steamboat Springs, Colo., has used Macintoshes for more than two years. It began with the 128K-byte Mac and later upgraded when the Macintosh 512 became available. Five of these computers handled all the bank's operations. As the bank grew, though, it also required more power, says Lawrence Fain, the bank's president.

A year after Western Industrial installed its Macintoshes, it began timesharing a mainframe at the Citicorp service bureau in Denver to handle its transaction processing and accounting. A condition of the agreement, Fain recalls, was that the bank could use its Macintoshes to access Citicorp's system. Western Industrial found its networking solution in Tri-Data's Netway 1000A.

Netway, which sits on an Appletalk network with three Macintoshes, communicates with the Citicorp mainframe through a dedicated phone line. A typical use, Fain says, is a teller cashing a check at the window. The transaction is registered automatically by the mainframe.

Unlike Western Industrial, Prudential, headquartered in Roseland, N.J., already had a large installed base of computers, from mainframes to micros. In fact, Prudential's IBM PCs number in the thousands, according to Pat Natale, vice-president of auditing. However, the PCs did not have the graphics capabilities for some of the applications the auditing group wanted to run, so it installed Macintoshes.

The auditing group now has 60 to 70 Macintosh 512s and 512 Pluses, Natale estimates. They are used to draw flow charts, minimize training costs in some areas and produce auditing reports. Because the Mac users have to pull information from the company's mainframes, Prudential has installed Avatar Technologies, Inc.'s Macmainframe, a combined hardware and software micro-to-mainframe communications link. Macmainframe attaches directly to an IBM 3274 or 3276 control unit using coaxial cable, and it can be connected either locally or remotely to the Mac's modem port.

Unmatched graphics

Prudential's choice of the Macintosh for certain applications touches on an important reason users purchased Macintoshes — the machines' unmatched graphics capabilities. The Mac provides

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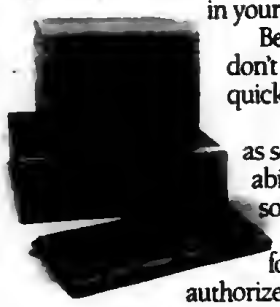

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VENDOR SPOTLIGHT

the best graphics-based applications on a personal workstation, Squibb's Sprague claims. "We never found a combination of software running on the IBM PC that would do the same kind of job in any relatively easy way."

The fundamental problem with PCs and clones, Sprague says, is that they are text-based machines. "The graphics are extra and require an add-on board." Because the Mac is a graphics-based system, he explains, graphics and text on the system are automatically compatible.

Two packages used extensively by the Squibb researchers are Cambridge Scientific Computing, Inc.'s Chem Draw and Cricket Software's Cricket Graph. Chem Draw is a modified version of Apple's Macdraw software that was developed by Harvard University Professor Stewart Rubenstein, who wanted to prepare publishable chemical structures on a computer.

'A simple and elegant solution'

Scientists can use Chem Draw to draw the chemical structure and then add a graphic representation, such as a pie chart or X-Y graph created with Cricket Graph. "It's a simple and elegant solution," Sprague says.

For Seafirst Bank, simplicity and ease of use were primary concerns. When Seafirst wanted to use personal workstations as terminals to the host, communications was an inarguable factor. However, it found that several companies provide good connectivity products for IBM PCs. The emphasis for the bank shifted to the Mac and the machine's ease of use.

Seafirst's goal was to make its 2,000 users proficient with minimum training, according to Turnpaugh. "The question for us was how to supply our users with the least technical, easiest to use system so they never have to know operating system commands, one in which everything is done graphically," he explains.

Most places supply computers to the 5% to 10% of the employees who are willing to learn arcane operating system commands, Turnpaugh notes; they do not address the other 90% who can benefit but do not want to be computer literate.

Seafirst's approach appears to have paid off. The ratio of proficient Mac users to PC users, Turnpaugh reports, is almost eight to one.

Isolated from software and hardware support facilities, ease of use is crucial for Western Industrial. Located in a resort town in the Rockies approximately 150 miles from Denver, the bank needs a system that allows users to be self-sufficient. "When one has a number of people using the same machine, one has to either teach them or arrange for them to be taught," states bank President Fain. "The Macintosh is much easier for users to learn."

Beyond the friendliness of the applications, ease of use is a necessary function of the Mac's durability. Each Macintosh is used by three to five users in a day, Fain explains. It is important, he says, for these systems to function consistently without special treatment or caution. The machines appear to have met this need. "We haven't needed support," Fain reports.

Corporate users may emphasize different qualities of the Macintosh, but they use many of the same applications available for it.

Some users, like Deere, have realized significant savings from using certain packages. Microsoft's Excel has helped reduce the design cycle time at Deere, according to Foster. Before bringing in the Macintoshes, design costing was largely a hand process, he says. The design engineer designed an equipment part and handed it to a process engineer who would decide how to manufacture the part. The process engineer then sent the plans to the accounting department where the manufacturing cost was calculated. Finally, the design and cost estimate were returned to the engineers so they could either proceed or adjust the design. The process, Foster says, took two weeks.

Now, after devising a manufacture scheme, the process engineer uses his Mac and Excel to calculate the cost. The turnaround now takes two to three

> *'Our users [need] the least technical, easiest to use system, . . . one in which everything is done graphically.'*
>
> — Tim Turnpaugh
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hours, Foster reports. "This has allowed us to cut down dramatically the time it takes to bring a new product to the line."

Seafirst has found alternative uses for its applications software. The bank uses Apple's Macproject for product planning, but the MIS department also found it useful for pictorializing the production engineering of computer systems, Turnpaugh says.

First, the product is used for checking data flow. "I can look at a job and say when it will be done," he explains. Then, by analyzing the flow, MIS can work to achieve better performance. "For example, in a three-hour period, I can view the entire critical path of data flow in the bank," Turnpaugh says. "I then can see how to engineer that better."

Users may run varied applications on their Macintoshes, but they do agree on one aspect of their machines. The users all extol the utility of the Macintosh. The basis for their fervor comes from two factors: ease of use and versatile graphics. Users, who have placed a premium on ease of use, have apparently been satisfied. In fact, the corporate representatives who spoke with *Computerworld Focus* unanimously lauded the short learning curve of novice users.

Hard to keep users off machines

Reflecting the experiences at other companies, Squibb's Sprague notes, "It's difficult to keep users off the machines." By contrast, he says, some people have had IBM PCs gathering dust for years because they didn't have time to learn the codes. "Those same people use Macintoshes on a daily basis."

The users' general satisfaction with the Macintosh has not crowded out room for improvement, though. Some companies look toward bigger screens and better communications. Squibb is in the process of buying a big screen enhancement that converts the Macintosh into a 17-in. screen, Sprague says. "A deficiency with the Mac is its small screen."

Squibb is also working to improve its communications capabilities. As an alternative to its RS-232 connection between Macintoshes and DEC VAXs, it has purchased tools from Apple that should allow a direct connect between a VAX and the Mac, Sprague explains. Once the connection is made, he says, "the VAX will appear as an icon on the Apple computer."

Deere is planning to install Macintoshes as terminals to workstations running University of California at Berkeley Unix 4.2, Foster says. "We're looking forward to an open Mac interface with Unix computers," he states, "and we want to put the Macintosh on Ethernet because we have a lot of Unix-based computers here."

Open architecture Mac by '87?

An open architecture and the availability of third-party Ethernet and IBM Token-Ring adapters will open up the market for the Macintosh, concurs Goulde of the Yankee Group. He says he expects Apple to announce the open architecture in the first quarter of 1987. One third-party supplier for the IBM Token-Ring network is Novell, Inc., which has recommitted to developing its Netware for the Macintosh. Its availability may coincide with Apple's open architecture, Goulde says.

Finally, the goal for Seafirst is to improve the ways in which Macintosh documents are shipped through its IBM network, and the bank is doing something about it. Using the IBM system's data base, Turnpaugh explains, MIS has written a set of software that allows users to ship Mac documents through electronic mail. The software, which has built-in intelligence, he says, will be introduced throughout the bank in mid-November.

The software will allow users to handle files in two ways. First, it can take Macwrite documents and translate them into an E-mail message. Second, the software can ship files through the system and load them into another Macintosh while maintaining the documents' font control. "It is to the Mac what the Distributed Office Support Systems are to IBM," Turnpaugh says, "only a heck of a lot cheaper." F

Hurst is a Computerworld Focus *senior writer.*

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Similar Taste In Software

The best solution isn't always the most expensive, some corporate users have discovered.

Many application packages for the Apple Computer, Inc. Macintosh have found an important place among Mac users interviewed by *Computerworld Focus*. The Seafirst Bank, John Deere Dubuque Works, E. R. Squibb & Sons, Inc., The Prudential Insurance Company of America and The Western Industrial Bank use many of the same software packages available for the Mac.

Two of the most popular applications are Apple's Macwrite word processing software and Microsoft Corp.'s Excel spreadsheet package. Three out of five users surveyed by *Computerworld Focus* — The Prudential, The Western Industrial Bank and Seafirst Bank — reported using these applications.

Commonly used graphics and design packages include Microsoft Chart, Apple's Macdraw and Aldus Corp.'s Pagemaker. Users also reported using a variety of data bases, including Blythe Software, Inc.'s Omnis III, Lotus Development Corp.'s Jazz and Forethought, Inc.'s Filemaker Plus.

— Rebecca Hurst

SPECIAL SECTION: DESKTOP PUBLISHING

Classifying Desktop Publishing

DAVE PICKLEY

·BY·AMY·WOHL·

Desktop publishing might be this year's hula hoop — here today, at the garage sale tomorrow. Then again, it could be the next color television — a significant enhancement of an existing technology that extends and changes its usefulness.

Fortunately, it seems that vendors and end users see desktop publishing as the latter case.

On the surface, desktop publishing looks like something different: a new way to use a personal computer to create output that resembles typesetting, that is integrated with graphics and that costs little in terms of both equipment and operator training. Many desktop publishing applications do not require a trained operator at all; anyone who can read the screen will do.

But desktop publishing is not some new attraction; it has a long tradition behind it. It represents both the ultimate way to output from a word processor and a downsize, down-scale, easy-to-use version of formal printing.

Desktop publishing was formed from a base of three pieces of technological know-how:

- Inexpensive workstations that offer sufficient processing speed and enough storage to support a power- and space-hungry application at a very small cost.
- New and much friendlier interfaces, based, in part, on the availability of the previously mentioned additional workstation capability.
- Inexpensive laser copier/printers allowing replication of printed typefaces at near-printing quality and occasionally, integration of graphics and images.

With these technologies in place, desktop publishing was ready to be born.

There is some controversy as to exactly what desktop publishing is. Whatever the definition, desktop publishing is certainly a hot, new buzzword, and every vendor wants to latch on. Hence, many are promoting products that are clearly not desktop publishing systems.

Word processing software is not desktop publishing, regardless of whether it can support multiple fonts on output or even on the display. There will be a whole rethinking of word processing as a result of desktop publishing technology, but this does not make WP synonymous with desktop publishing. However, it is in the WP area that users will find it hardest to tell the difference, as high-end word processing software for personal computers resembles desktop publishing technology.

Formatters command languages for laser printers are very useful when trying to get the most out of a PC, word processing software and a laser printer such as Hewlett-Packard's Laserjet or Apple Computer, Inc.'s Laserwriter. These languages are not as easy to use nor as fully functioning as desktop publishing packages, but they are usually inexpensive. It is probably best to say that formatters command languages for laser printers are simply different from desktop publishing systems.

Software and hardware peripherals to support the desktop publishing function may also be touted as desktop publishing technology. Into this category fall all sorts of things that are useful, desirable and perhaps even necessary; but most of these items on their own are not desktop publishing. Take, for instance, the man at a National Computer Conference who claimed his firm had "a breakthrough desktop publishing product that will revolutionize the industry." It was not a desktop publishing software package at all — just a product with some nice, standard type fonts offered for use in a PC and a laser printer environment.

The key is that many products are only useful as part of someone else's desktop publishing environment; what users need are products that are compatible with what they are planning to buy. It is unlikely that a user would change his choice of a system to take advantage of these add-ons.

Desktop publishing is also not a replacement for the in-plant or full-service print shop, especially if one seeks printing quality of 2,500 dot/in. resolution rather

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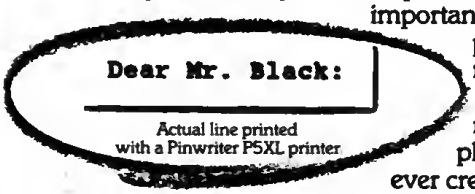

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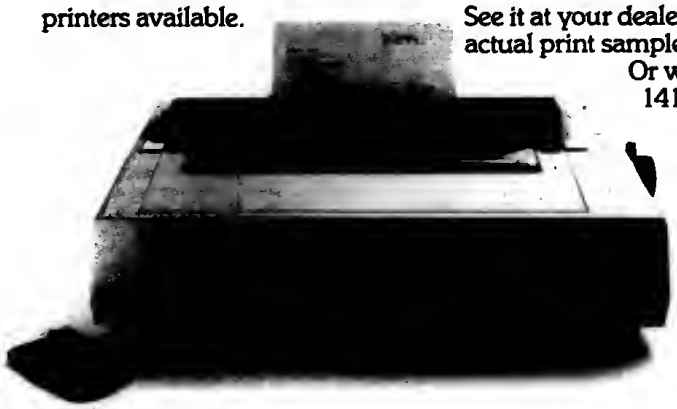

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SPECIAL SECTION: DESKTOP PUBLISHING

than 300 dot/in., high-volume production or full color.

Having seen what desktop publishing is not, here is a definition of what it is. Desktop publishing is a set of hardware and software, based on a multifunction personal computer, which provides the ability to produce near-typeset-quality output, including the ability to produce multiple type fonts, sizes and styles.

To be a true desktop publishing system, the product must have a what-you-see-is-what-you-get presentation of text, the ability to integrate and view on the screen at least simple graphics and a visible, English language interface such as the pull-down menus of an Apple Macintosh or the English-labeled icons of Digital Research, Inc.'s Graphics Environment Manager.

The point here is ease of training. Desktop publishing's biggest advantages are in its simplicity and accessibility. Even a casual user can learn to produce a two-column, multifont page in an hour or two. It is the ability to *see* the result of an action directly on the screen, with type fonts, sizes and line endings preserved, that makes these products so easy to use.

Pricing is an issue, too. You should be able to buy an entire desktop publishing environment, workstation, printer and software for less than $10,000. This is a big part of the accessibility issue; nearly anyone can afford it.

However, many jobs are too big or too complex for desktop publishing to handle. A fair amount of work will be required in the next year or two to keep the desktop publishing enthusiasts from trying to move all of their corporate printing and publishing onto a Macintosh. It would not work. (Just as not all data bases were designed to run on personal computers, some big data bases are always going to need their mainframe environments.)

Desktop publishing is not suited for the following jobs:

■ The very long document (typically more than 100 pages). A lot of desktop publishing software will not arbitrarily handle very long documents because these documents do not fit on some machines, particularly if a user is utilizing software that needs one copy of a document stored for safekeeping, one copy to work on and another copy in the print queue.

■ The very complex document. If your document includes text and graphics, a halftone, computer-generated drawing plus a scanned image and a mathematical formula, it may need a specialized system that is better suited to such complexity.

■ The multiple-author document. PCs on their own are not good at handling multiauthor documents of even limited complexity. Combined with encompassing environments, they can do much more, but few local-area network environments are prepared to handle the complexity of the multiauthor document with complex formats, particularly if a great deal of existing equipment, which may not be compatible, must be supported.

■ Color output. Users need higher quality, less expensive color printers to produce multiple copies of colored output.

■ Very large volumes. Desktop publishing printers are still, at this juncture, intended for the small-volume run. They are the most expensive type of output option to use. Also, their lifetime cycle is too short (typically 3,500 to 5,000 copies per month, 100,000 to 150,000 copies between major overhauls) to support large print volumes.

In addition, if the print run is very large, the economies of desktop publishing to produce the original master become insignificant. However, the economies of time and control remain to the advantage of the desktop environment.

Now that users have seen applications that desktop publishing cannot be used for, perhaps they can understand for what it can be used.

Desktop publishing is intended to permit the office worker to create a better level of output without demanding unreasonable investments in training time or equipment cost. Some desktop publishing applications include the following:

■ Newsletters. Some newsletters require only nice fonts, type sizes and styles and nothing fancier; others benefit mightily from the integration of data and graphics, scanned images, halftones and all kinds of print tricks.

■ Instructional materials. Everything from class handouts to audiovisuals and from technical manuals to maintenance information, benefits from being easier to read. The ability to maintain rapidly changing subject matter in electronic form for quick updates and, in some cases, on-demand publication, is invaluable.

■ Marketing materials. Brochures, product descriptions and promotional materials all look better and can be produced faster and more inexpensively by using desktop publishing.

Many users can create a whole new class of promotional material, previously done with a word processor and a copier because of cost or time constraints, using a desktop publishing system. This category of promotional material probably would not be done with conventional printing techniques because of short runs, cost and limited time to produce.

■ Personnel documents and internal communications. All kinds of corporate information on benefits, rules, invitations, summaries, announcements and changes can be enhanced with desktop publishing.

The idea is nearly always to improve output quality, only minimally increase the costs and impact scheduling as little as possible. And *always*, the idea is to keep the work as close to its creator as might be desired. There is no need for lots of expensive specialists when all that is desired is multiple type fonts and sizes and perhaps a two-column layout.

The indirect savings can be staggering; multiple inputting is avoided, the need to proofread after each rekeying is eliminated, and there is no more production of paper galleys, a galley-correction cycle or the need for an artist to provide pasteup. Corrections become painless, performed on the fly with the aid of automated spelling checkers.

Multiple output options can be explored; a user can utilize a video display or inexpensive (about $.09 per page) laser output. Where desired, the user can choose to use the desktop publishing process as a shortcut to producing typeset output at full printing quality.

And who will make a fortune selling into this market? Apple has already carved out a market niche for its Macintosh as an easy-to-use desktop publisher. Xerox Corp. seeks to be a full-line vendor, with everything from Ventura, which may be the best IBM PC software package for desktop publishing so far, to its specialized 6085 Documenter system to its full-blown corporate publishing systems.

Dozens of third-party software vendors, including every major word processing PC software vendor, are lining up to enter the fray. IBM is standing on the sidelines, whispering of things to come. And several on-the-way-to-oblivion, traditional word processing vendors might just rescue themselves by becoming office publishing vendors.

Eastman Kodak Co. could join workstations to printers and become a formidable competitor. Digital Equipment Corp. is likely to field an entry of its own. And, it is unlikely that users have heard the last of traditional phototypesetting vendors, which, although eager to hold on to market shares, are likely to be greatly impacted by the acceptance of desktop publishing quality output.

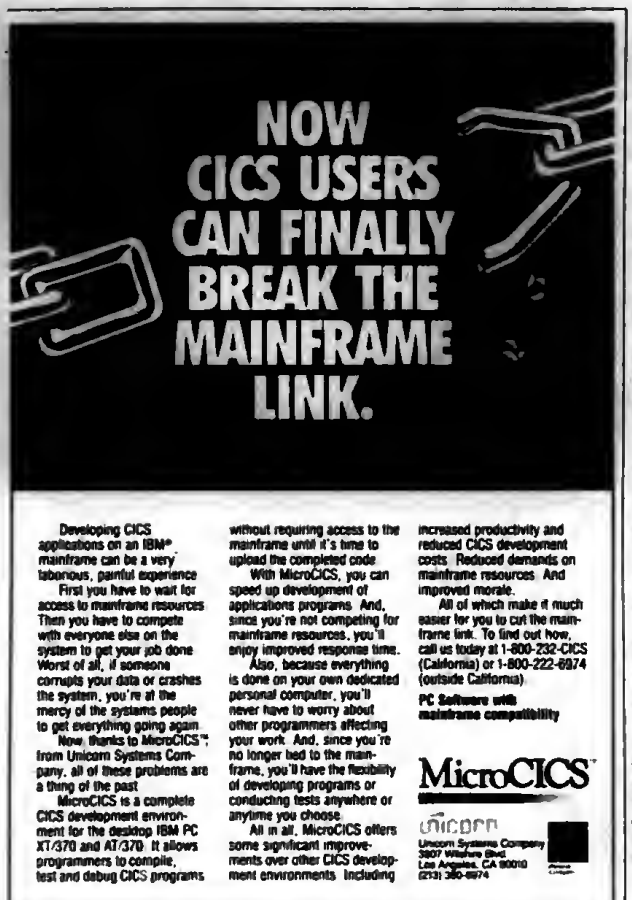
Users should also keep in touch with the advance of technology that greatly enhances early levels of quality. Users are awaiting 600 dot/in. printers in 1987 with rumors of color, higher volumes and much better graphics abounding.

> *Dozens of third-party software vendors, including every major word processing PC software vendor, are lining up to enter the desktop publishing fray.*

By 1987, word processing software vendors should be integrating their text and desktop publishing offerings so that by 1988 or 1989, a user may find it difficult to tell where one leaves off and the other begins.

But aesthetic judgment and artistic talent, long a part of professional printing, are not so easily parceled out. These abilities will be built into systems as artificial intelligence permits the creation of printing experts. But that will take just a little bit longer. ■

Wohl is the president of Wohl Associates, an office automation consulting firm located in Bala Cynwyd, Pa. Wohl is also editor and publisher of "The Wohl Report on End-User Computing," a monthly newsletter.



CIRCLE READER SERVICE NUMBER 130

SPECIAL SECTION:
DESKTOP PUBLISHING

Checking Out Publishing Software

DAVE RIDLEY

·BY·MORTON·ROSENTHAL·

Most corporate users of IBM Personal Computers are no longer content with documents produced using the text-oriented, single typeface available from a daisywheel, letter-quality printer. Now, the desire for a variety of font styles and sizes as well as the need to incorporate graphics and text have escalated the demand for software that can produce high-quality printed material without the high cost of professional typesetting.

To meet this need, manufacturers have introduced desktop publishing software, sophisticated products that integrate text and graphics and provide control of a document's appearance and layout. These products bring the capabilities of professional typesetting and printing to the office and provide tools that allow nearly anyone to produce a variety of documents, including forms, catalogs, brochures and newsletters, with little typesetting knowledge and limited hardware requirements.

A basic desktop publishing system for the IBM PC consists of a personal computer, page layout software and a printer such as a laser printer. Because professional typesetting can cost as much as $50 per page — more if graphics are included — in-house publishing offers a cost-effective alternative. The savings depend on the initial cost of the software and the amount of printing that a company does. However, because the list price of desktop publishing packages ranges from $300 to $1,000, it is possible that the initial cost of the software can be recouped in as few as six pages.

In-house publication provides control of the production of a document. Users can experiment with a document's layout and format to find the design that is the most appropriate or visually pleasing for a project. Users can avoid the hassle of getting copy ready to meet a typesetting deadline because they control the production. Making last-minute changes is cheaper and faster using a desktop publishing product than it is making changes to a typeset proof.

The following are some examples of how desktop publishing can be most effectively used and some of the current products available:

■ **High-end word processing software.**

This software, with its powerful editing capabilities and the ability to produce different font styles, offers the simplest desktop publishing schema. It is ideal for creating newsletters, proposals, letters, memos and other simple publications that need consistent style and appearance but do not require professional typesetting.

One strong contender in this arena is Microsoft Corp.'s Microsoft Word, which can handle complex formatting, multiple columns and headlines. With this tool a user can produce a style sheet that controls page layout and format of characters, paragraphs and the entire document. The product supports a variety of built-in and downloadable fonts for many printers, including the Hewlett-Packard Co. Laserjet and Laserjet Plus.

Another product, Spellbinder Desktop Publisher from Lexisoft, Inc., includes Spellbinder Office Automation and Management, a full-featured word processor, and Personal Publisher, which provides typesetting capabilities. Good for creating newsletters, proposals and reports, this product lets a user include as many as 16 fonts into a single document and allows integration of text and graphs; it also includes horizontal and vertical leading and kerning. This type of product reads files written in Lotus Development Corp.'s 1-2-3, Z-Soft's PC Paintbrush and ASCII formats and can import images from Datacopy Corp. scanners.

■ **Page layout programs.**

For more sophisticated documents with graphics, these programs let users customize a document with icons and graphic symbols. These what-you-see-is-what-you-get (WYSIWYG) products let users view on the screen exactly how the product will appear when printed. Relatively easy to use, these programs usually have pull-down menus and an

SPECIAL SECTION: DESKTOP PUBLISHING

interface similar to that of the Apple Computer, Inc. Macintosh. While users need not be familiar with typesetting techniques or layout designs, the choices for layout and formatting are limited to the menu selections.

Front Page, from Studio Software Corp., requires no prior knowledge of typesetting. The program has full control of typographic features including hyphenation, kerning, justification and type size. The product allows graphs to be integrated from programs such as Lotus' 1-2-3 and Freelance, Autodesk, Inc.'s Autocad and Mouse Systems' PC Paint. Scanned images can be imported to create logos or pictures, and the freehand drawing function allows you to create your own artwork.

Pagemaker from Aldus Corp. runs under Microsoft Windows. It includes automatic dictionary-based hyphenation, manual and automatic kerning, word spacing and a large, 128-page-per-file capacity.

It imports formatted text files from a variety of word processors including Ashton-Tate's Multimate and Wordperfect Corp.'s Wordperfect and reads ASCII and IBM Document Content Architecture file formats. Bit-mapped graphics can be imported from PC Paintbrush, Microsoft Windows Paint and PC Paint.

Clickart Personal Publisher from Software Publishing is one choice for creating small documents such as multicolumn publications and newsletters, advertising layouts, promotional leaflets or invitations. It contains a portfolio of graphics images including lines and boxes to add to layouts.

In addition, users can draw their own images. They can even capture and edit a symbol from another program by using the Snapshot Utility, which lets users display the captured image to enlarge, shrink or change the perspective of the image and save it for future use. A baseline feature lets users control the length and placement of text on a line-by-line basis.

Software Publishing's Harvard Professional Publisher integrates text, graphics and scanned images to create a variety of publications. Although it is menu driven, the product provides advanced typesetting features that include kerning, reverse type, contoured text runarounds and gray-scale tints. It was designed for users who have typesetting experience and demand professional-quality output.

Like Harvard Professional Publisher, Xerox Desktop Publisher from Xerox Corp. is a WYSIWYG product with advanced typesetting features. Users with design and typesetting experience can design layouts with extensive formatting; otherwise, they can select from a variety of predesigned layouts. This product accepts graphics from Autocad, Digital Research, Inc. GEM Collection, Lotus's 1-2-3 and Symphony and PC Paintbrush, among others.

■ Production typesetting software.

This tool provides the most sophisticated options in desktop publishing. Based upon professional typesetting techniques and capable of producing typeset-quality documents complete with graphics, these packages offer advanced features such as kerning, automatic hyphenation, leading and pica and point measurements.

More difficult to use than page layout programs, this software usually consists of command-structured programs that offer far more options than are available on menu-oriented programs. The screen does not display the final product; instead, users must invoke a preview option to view the layout of a page. Because of the sophistication and complexity of these systems, they are recommended only for users with typesetting experience.

Graham Software Corp.'s SClaserplus can handle long documents and books that combine tables, charts and complex formatting. It contains four programs: Writer Plus, Icon Editor, Screen Snapshot and Formatter.

The first program is a text editor with a spelling checker that is used to create the document. Icon Editor lets users create or modify pictures, logos and symbols within the text. Random-access memory-resident Screen Snapshot enables users to capture a graphic from another program, incorporate it into a text file and customize the picture. The Formatter allows microjustification of up to six columns and organization by chapters, headings and subsections.

Deskset from G. O. Graphics is capable of incorporating graphics into newsletters, leaflets and reports. It contains fonts that are organized into libraries with as many as 256 fonts per library; new fonts can be added. Any font can be condensed or expanded, and all characters can be displayed with reverse video. You can choose measurements of inches, centimeters, picas or points to determine justification and reduce or enlarge your page as much as twice its actual size.

Drawbacks

Despite the control that desktop publishing provides, there are drawbacks. Because the quality of the print depends upon the printer used, final copy will not be as clear as output from a commercial typesetter. Most desktop publishing packages support laser printers, which produce multiple fonts and typefaces. However, the best laser printer produces 300 dot/in. compared with the 1,200 dot/in. produced by a phototypesetting machine.

Although for some projects the quality of print from the laser printer may be more than adequate, other documents will require the higher resolution available only through the professional typesetting process. The newest desktop publishing products for the IBM PC, however, allow a document to be proofed on the printer, then sent directly to the typesetter for high-quality output.

For most office production, savings in time and money more than compensate for a difference in quality. As software becomes more sophisticated, companies are beginning to appreciate how easy it is to integrate graphics and text into high-quality output using the latest advances in desktop publishing. F

Rosenthal is chairman and chief executive officer of Canton, Mass.-based Corporate Software, Inc., a full-service supplier of personal computer software to Fortune 1,000 companies. A contributor to this account, Kelly Clerkin, is a Corporate Software product manager who specializes in desktop publishing software.

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Know Your Publishing Terms

While desktop publishing is making its way into the corporate office, the terms of the trade are making their way into the corporate vocabulary. The following is a list of desktop publishing expressions:

Baseline. A line serving as a base for measurement or comparison.

Bleed. Running the image to the edge of a page.

Camera ready. Copy ready to be photographed for printing.

Column inch. An area one column wide by 1 inch high.

Composition. Arranging the way a page will appear by combining typeset elements, margins and column settings into a specific layout.

Dummy. A sample layout presenting the position of images and text as they will appear in the final output.

Em space. A fixed space, usually the width of an uppercase "M" of the font and typeface being used.

En space. A fixed space, equal to one-half the number of units of the Em space.

Font. A complete set of type of a single size and face.

Galley proof. A printer's proof taken from composed type before the page is complete, upon which errors can be marked for correction.

Gutter. The white space between printed areas on facing pages or columns on a single page.

Justification. Aligning text to produce even margins on a page.

Kerning. Reducing the amount of space between characters. The portion of typeface that projects beyond the body of a character, thus lessening the space between characters.

Layout. The spread or arrangement of images and text on a page.

Line spacing, or leading. Amount of space, usually measured in point size, between two succeeding lines of text from baseline to baseline.

Offset. Indirect image transfer, such as printing from photographic plates.

Pastup. A layout made of typed proofs and/or art exactly positioned and prepared for an offset photo.

Pica. A unit of measurement equal to one-sixth of an inch.

Point. A unit of measurement equal to one-seventy secondth of an inch. With 72 points to an inch, there are 12 points to a pica.

Quadding. Placement of a line of text. Quad left places text flush against the left margin, quad right places text flush against the right margin, and quad center places text an equal distance from either margin.

Ragged. Copy that is not justified.

Runaround. Setting type in a specific shape through the use of indents. Creates copy that is contoured.

Thin space. A fixed unit of space that is one-fourth the width of an Em space and one-half the width of an En space.

SPECIAL SECTION: DESKTOP PUBLISHING

Tracking NJ Transit's Progress

DAVE RIDLEY

·BY·REBECCA·HURST·

NJ Transit Rail Operations, Inc. has begun laying tracks for an in-house, electronic publishing system. But charting unfamiliar territory is not new to the transportation firm; its latest venture is part of the company's three-year exploration of office automation technologies.

A subsidiary of the New Jersey Transit Corp., the Newark-based rail company operates 380 miles of track and serves 781.8 million miles of passenger routes annually. To control these operations, the company has an elaborate, computerized signal control system, explains Joel Golub, assistant director of MIS for Rail Operations. "It keeps track of where a train is at any given point along its path."

While rail functions have been automated for several years, computers have played a part in office administration for only three years at Rail Operations and NJ Transit as a whole. In 1982, Golub recalls, NJ Transit did not have an MIS department. NJ Transit Bus Operations, Inc., another subidiary, had a card-oriented electronic accounting machine to handle payroll. Elsewhere, much of the work was manual. "I was the first person to carry a terminal into Bus Operations," says Golub, who was then working at the bus subsidiary. "People were counting tickets by hand."

By late 1982, NJ Transit had recruited Joseph Vinciguerra as MIS director to build an MIS organization. The result, Golub says, is an organization of 92 people, including groups to handle the rail and bus subsidiaries, the data center and headquarters.

For the first two years, MIS has focused on providing a core group of applications, Golub states. "We concentrated on systems for payroll, materials, budgeting and inventory." In 1984, he says, the company began installing NBI, Inc.'s Unix-based office automation system to handle applications such as spreadsheets and word processing.

Rail Operations' OA system consists of 40 NBI 4000 diskless workstations and a combination of 10 IBM Personal Computers and Personal Computer XTs networked to four NBI cluster controllers — two Oasys 64s and two Oasys 64/Es. The rail company has another two Oasys 64s serving remote locations. Everything is linked into the NBI network using coaxial cable. To allow the IBM machines to use the network, MIS uses an interface board from NBI that fits into the personal computer.

Also linked to the network is NBI's electronic publishing workstation, the Integrated Workstation (IWS). The system fills the need for high-quality presentation materials and documents, Golub says. "We're an MIS service to our company, and we sell our services."

With IWS, Golub notes, he can create aesthetically attractive documents that catch the reader's eye. "There's no comparison between a document done with word processing and one done using IWS," he asserts.

Although there are several electronic publishing workstations available, the Rail Operations' MIS says it felt that IWS would integrate well with the existing equipment. "We could put another vendor's product there," Golub says, "but it would not do the same kinds of functions." In addition, another system might lose some formatting and characters when documents were transmitted. The Bus Operations' division already had purchased Xerox Corp.'s Star publishing workstation, he notes. It is a good system, Golub says, but, he explains, "We have used the NBI system to transmit to the Xerox Star. It works 99%. We don't lose text or major formatting, but we lose bold and underlines."

By contrast, Golub says, IWS integrates well with the systems on the network because it is a superset of NBI's word processing workstations. "You have what you had with the old, only you have more." The advantages he cites are full compatibility and ease of use. "Anyone who knows the NBI 4000 can immediately jump to IWS in terms of word processing," Golub states. His own part-time, self-styled training

SPECIAL SECTION: DESKTOP PUBLISHING

for IWS took about six weeks, he says.

Golub attributes the workstation's ease of use to NBI's support and to functions on IWS. The workstation itself has several Help functions, he reports. In addition, he praised the flexibility of IWS' icon-based interface, which allows users to arrange applications the same way they would order projects on a desk.

Several other features enhance IWS, according to Golub. The software automatically corrects all references to a piece of data, both in charts and text, when the user changes the data. IWS also repaginates documents as users alter the content.

The Undo command

A useful function in training, Golub says, is NBI's Undo command. "I'll make a mistake somewhere, and I can hit the Undo key, and the document returns to what it looked like one keystroke before." Finally, IWS can output to both laser printers and professional typesetters. Rail Operations does not output to typesetters now, Golub says, but it may choose to do so in the future.

To date, only Golub and his secretary, who has worked with IWS since February 1985, have used the workstation. "The machine is just coming out of beta test," Golub explains. "We've tested it and learned how to use it. The next step is implementing it in our organization."

Ultimately, IWS will act as a finishing tool for documents created on other computers along the network, Golub says.

As a stand-alone system, though, IWS has been used effectively to cut costs and improve a document's appearance. For example, Golub has used the workstation to draw organizational charts to represent MIS to users. "IWS has saved us time by allowing us to make changes without redrawing the charts," he says. Similarly, Golub uses IWS to create floor plans. "I can't tell you how many times I've had to sketch a move that takes place. It can take hours." With IWS, a user can start with an existing illustration and move the elements around with a mouse.

The most extensive use of IWS is likely to include the publishing of government reports, proposals and manuals. In combination with the Apple Computer, Inc. Laserwriter, IWS allows users to create a professional document, Golub says. It also can provide formats that users can follow to create their documents.

In addition to formatting, Golub says, the ability to embed graphics allows users to save time. Systems manuals change often, he says. Word processors can quickly make textual changes, but they cannot integrate graphics. The rail company has templates to help users create diagrams manually.

> *'I've saved time, and if I save time, that gives me more time to put systems in this organization that contribute to the bottom line.'*
>
> **— Joel Golub**
> **NJ Transit Rail Operations, Inc.**

The workstation also has been used to speed up the employee review process, Golub states. In other companies, he explains, someone has to use a typewriter to fill out a review sheet such as that used at NJ Transit because the word processor will not handle it. By contrast, Golub explains, "We're able to put the review forms directly on IWS and then make modifications."

Once IWS is available to other users, Golub envisions that they will be able to pull information from various files to produce reports and other documents. "There are a lot of tools in IWS for capturing different documents and blending them into one very professional report," he says.

Primarily an IBM shop

One current limitation for IWS beyond the realm of NBI Net is that NJ Transit is primarily an IBM architecture shop. IBM serves as the cornerstone of MIS in part due to economics and the U.S. Congress. In 1982, Congress ordered Conrail to cease its passenger operations, and NJ Transit took over the commuter rail service in New Jersey, establishing it as NJ Transit Rail Operations in January 1983. Along with Conrail's commuter lines, NJ Transit also acquired some of its IBM systems and applications. The company retained the systems to keep the railroad lines going, Golub explains.

Additionally, NJ Transit was time-sharing with the Boston & Maine Corp., a transportation firm headquartered in Billerica, Mass. "Boston & Maine gave us an opportunity to get started," Golub recalls. "We developed systems with them." Like the applications inherited from Conrail, these were based on IBM as well.

The use of NBI equipment does not contradict MIS policy, however, Golub asserts. First, NJ Transit is not committed to IBM as its sole vendor. For example, the company uses an Amdahl Corp. 4705 controller as a front end to its IBM 4381 and 4341 computers. Second, NBI provides products that allow its systems to communicate with the IBM world. "I'm concerned about using IBM's 3270 and Systems Network Architecture," Golub says, "and NBI can do it." In fact, he hopes to have 3270 implemented on the Oasys machines by the end of 1986.

Adding 3270 emulation to the network will provide some immediate advantages. It will allow users on NBI Net to access the IBM electronic mail system at NJ Transit. It will also provide a cheap entry for users who need to access the mainframe. People who need to access the central inventory management system, for example, can do so from an NBI 4000 or IBM PC. "I don't have to give them a $1,000 3270 terminal," Golub explains, "I can give them access through the controller that resides here."

However, 3270 emulation alone does not permit a PC or NBI user to download and share data. Therefore, IWS is unable to integrate mainframe data into a document or file. There is potential for this use of the workstation, Golub comments, but, he says, "We will need some sort of downloader, and that requires work to be done on the mainframe side as well."

One way in which Golub contemplates expanding communications to IWS is by providing an NBI remote link product to employees who work with personal computers at home. Users could create documents at home and then transmit them to IWS for document finishing, he suggests.

A more near-term plan is to purchase a higher resolution laser printer from Ricoh Corp. The Apple Laserwriter is good for many documents, but it does not shade black areas evenly, Golub explains.

The laser printers will not entirely replace the rail company's Okidata Corp. dot matrix printers, though. The company will have NBI write a print tailor for its Oasys computers that allows them to print on the Okidata printers. "There's some benefit for us because people could print low-quality documents for first drafts and then send them to IWS for document finishing," according to Golub.

Two enhancements from NBI that Golub would like to see are a better screen and more fonts. The quality of IWS's current monitor screen is good, Golub says, but he would like to see a larger one with higher resolution. The IWS system that Golub uses comes with a relatively small, 9- by 9-in. screen, Golub comments, but NBI recently announced the availability of a larger monitor. Concerning the diversity of fonts, he says, "That will come with time."

Cost savings expected

As Golub expands the use of IWS, he expects it to bring cost savings to Rail Operations. In his own use, he says, "I've saved time, and if I save time, that gives me more time to put systems in this organization that contribute to the bottom line." Similarly, he expects that the increased productivity of other employees will also lead to savings.

Golub says he believes the dollar savings also come in terms of opportunity costs. If he can put one terminal on a user's desk, instead of the two or four required for different functions in the office, "We can save money on hardware expenditures," he notes.

The company is saving hard-line dollars, according to Golub, although the amount has yet to be defined. "We have not done a complete financial evaluation of the IWS system, but we're saving through a very small investment."

Finally, one definite measure of IWS's effectiveness is the capacity in which it is used. As a stand-alone, IWS offers some useful functions, but it does not provide a complete solution. However, "In conjunction with other tools, IWS works very well."

Hurst is a Computerworld Focus *senior writer.*

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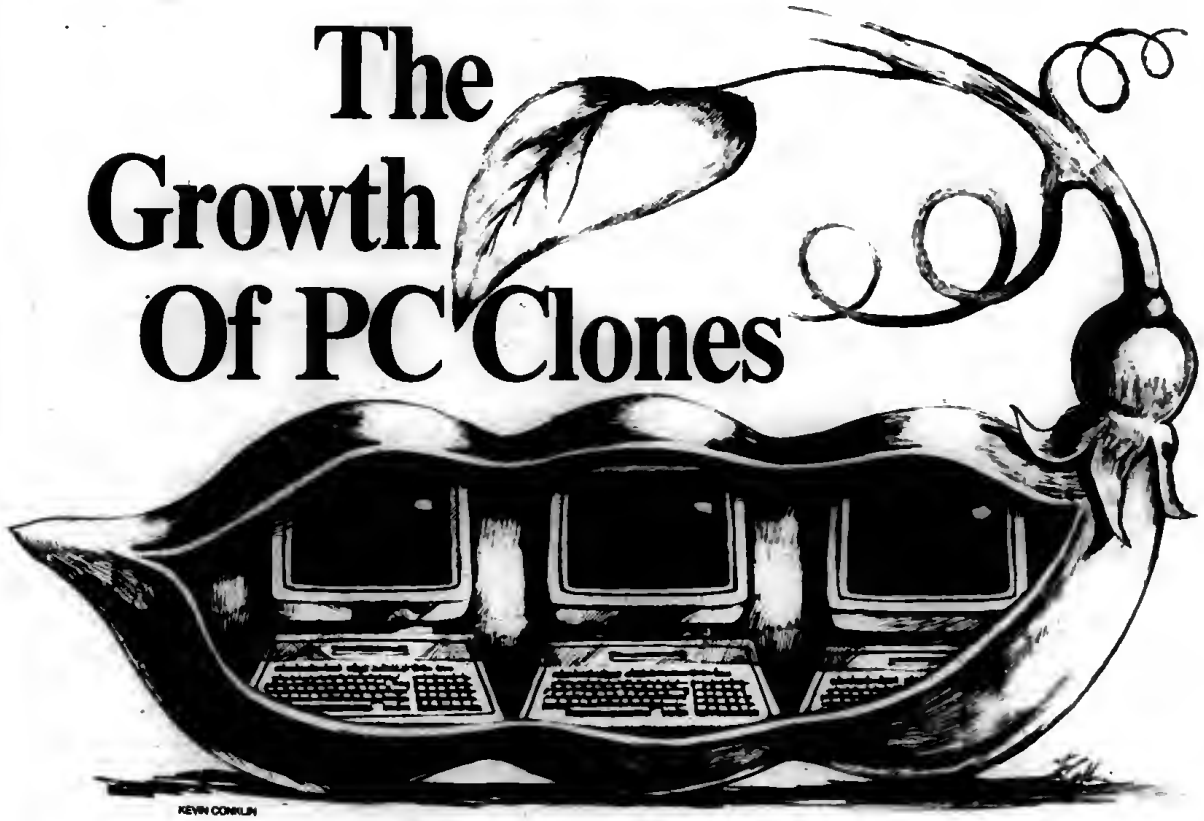
MARKET ANALYSIS

The Growth Of PC Clones



KEVIN CONKLIN

·BY·STAN·KOLODZIEJ·

IBM losing ground in a market? Unthinkable.

In the microcomputer arena, however, Big Blue is getting rained on from many quarters. The result has been a fall by IBM from a 45% share of the total U.S. micro market in 1985 to about 30% in 1986, according to Dataquest, Inc. in San Jose, Calif.

Much of the damage is coming from so-called clone companies, assemblers of low-priced IBM Personal Computer duplicates, which have been making inroads into smaller purchasing companies that do not carry the same loyalty to the IBM logo as the Fortune 500 crowd.

The ranks of the PC clone makers have swelled in the past few months. Unlike the designated PC-compatible companies such as Compaq Computer Corp., AT&T, Tandy Corp., Hewlett-Packard Co. and so on, clone makers make their sales primarily on price alone, lacking the extensive distribution, service and support network of the compatible vendors. Not only are upper tier compatibles close to IBM's prices, they often match or exceed them.

"Many compatible vendors use their PCs as part of an office systems strategy," explains Doug Cayne, a vice-president of the Gartner Group, Inc. in Stamford, Conn. "They use compatibles as a leverage to keep existing customers and to hook new customers into their integrated systems. Most compatible vendors bundle in something extra over the IBM machines, such as more power, more networking capability to plug into their office systems, extra software and so on. Unlike the clones, their prices have to be close to IBM's, but it's not essential to undercut."

For the clones, undercutting prices is everything, and the price, lately, has definitely been right. Look in almost any trade publication these days. Chances are the classifieds are filled with such colorful company names as 7th Heaven Computer, Blackship Computer Supply and QSP, Inc. Less than $1,500 can get you an IBM Personal Computer AT clone sporting a 6- to 8-MHz processor, 256K bytes of random-access memory expandable to 1.2M bytes, a 1.2M-byte floppy disk drive and numerous expansion slots. Stripped-down IBM PC and Personal Computer XT clones have now broken the $500 barrier. Even larger companies are finding the prices hard to resist, despite the hassles of mail order and 800 numbers.

While Compaq and other compatible vendors such as Wang Laboratories, Inc., Sperry Corp. and NCR Corp. rarely offer PC price differentials of 20% to 30% under their IBM counterparts, clone vendors can sell machines at half the price or less of equivalent IBM computers.

"The rest of the universe [non-Fortune 500 companies]," read a recent Gartner Group report, "is not locked into IBM. For the most part, these companies are price/performance conscious. They won't pay a premium for the IBM label. In the PC arena, they want competition and an open architecture.

"The larger companies," the report continued, "will not quickly turn over their existing installed base for a new technology, so they cannot absorb new systems. It's the smaller companies who waited [to purchase PCs] that are now making substantial commitments."

The Gartner study added that this year, IBM will have an estimated 82% of the Fortune 500 PC market; it is doubtful that IBM's share would be less than 75% for this same market in 1987.

With smaller, non-Fortune 500 companies, however, IBM's 1985 market share was only 45% and is expected to drop to 24% this year. Low-priced clone vendors, on the other hand, are expected to snare about 30% of this market, up from about 20% in 1985, according to the Gartner Group (see chart page 36).

Who are these clone vendors, and how do they do it?

The Asian connection is a big factor behind the clone craze. Companies in Taiwan, Hong Kong, South Korea, Singapore and, to a lesser extent, Japan, are using cheap labor to duplicate key microcomputer components such as the circuit boards carrying the PC's microprocessor, power supplies, controller cards and floppy disk drives.

MARKET ANALYSIS

The companies either use these parts to assemble their own PC clones or sell them to other clone assemblers in the area. Lately, however, these Asian companies have been doing a brisk business shipping components to start-up U.S. clone companies. Several large manufacturers such as Samsung Semiconductor & Telecommunications, Multitech, Daewoo Telecom Co., Mitac and Hyundai Group have now set up U.S. distributorships to streamline the channeling of their clones to U.S. customers.

First wave of clones

Ironically, this is not the first clone invasion. Some years back, IBM burned a few fingers by prosecuting clone manufacturers that had illegally copied IBM's PC read-only memory (ROM) BIOS chip. Duplicating the functions of the chip legally is possible but expensive, requiring tricky software programming and expertise. The barrier helped to stem the clone tide temporarily.

Times have changed, however. One innovative U.S. company, Phoenix Technologies Ltd. of Norwood, Mass., has enabled clone makers to skirt the muddy chip issue. Phoenix mass-produces and sells a set of five software packages, including its own ROM BIOS, and for as little as a $10-per-chip royalty charge, companies can copy the Phoenix chip for use in their machines. Other U.S. firms have sprung up to provide similar services.

The negative reaction by many companies toward suspect clone support, however, is being counterbalanced somewhat by the low prices and increasing reliability of the machines.

During the past five years every component of the IBM PC has been analyzed and copied to near perfection. This action has resulted in a kind of de facto standardization in the manufacture and reliability of parts for clones.

Major U.S. service organizations, for example, have reported insignificant differences in failure rates between the IBM machines and compatibles and that reliability is being carried over to the low-priced clones. Most PC repair work centers on the areas with the most moving parts, like disk drives. Most failures in these areas also occur within the first 30 days of use. After this period, the failure rate goes down dramatically.

"Clones are a little like the scare with Japanese automobiles in the '60s," Cayne says. "They're plentiful, cheap, but they don't have extensive support. Chances are, they'll work just fine, however."

Rayovac Corp., located in Madison, Wis., has installed 25 Turbo ATs from PC's Limited, an Austin, Texas, clone vendor. Though a traditional IBM shop, Rayovac also has several PC compatibles from Tandy, Compaq and Leading Edge Products, Inc. to complement the brunt of its PCs from IBM.

"The clones were bought on the basis of price and reliability," says Tim Nerenz, Rayovac's director of business systems. "The clones don't fail any more than the IBM machines and compatibles. Those that do break down have been serviced roughly as well as the others through a local retailer. I think we're ahead on all counts."

Others are not so positive. Peter Braun, manager of the information center at Helene Curtis, Inc. in Chicago, says the company looked at some clones before deciding to purchase 25 Epson America, Inc. Equity II compatibles to add to its roster of 30 IBM PCs.

"We talked to a few clone companies," Braun explains, "but were never quite convinced of their ability to provide adequate service and support."

Braun says the Epson machines won out because they were priced well and contained a number of features that neither the clones nor IBM could match.

"The [Microsoft Corp.] MS-DOS versions of the Epson machines are easier to use," Braun explains, "and there were little extras. The DIP switches are on the outside of the machines, so if you change the video displays, you don't have to take the machines apart. Also, it's easier than other machines to change the clock speed. The extras won us over. But, at the time, IBM hadn't yet cut the prices on its PCs. That might have made a difference in our decision."

Braun uses the Epson compatible as an example of how PC compatibles differ from PC clones.

"Compatibles are units that attempt to maintain their own integrity as distinct machines with new features," he says. "Clones are blatant attempts to mirror PCs without much individuality."

Another firm, St. Paul, Minn.-based Burlington Northern Railroad Co., scanned some low-priced clones but opted instead for some Leading Edge compatibles to add to an already existing base of compatibles from Compaq, Wang and HP.

"Price/performance is a big issue with us," explains Bob Bridges, assistant vice-president of computer operations at Burlington Northern. "For the same price [as the IBM machines] we can get the same performance from the compatibles, often more. Users have a direct influence on which machines we get, but we dissuade them from clones. It's a case of pragmatism. We have large-scale service contracts that don't cover clones."

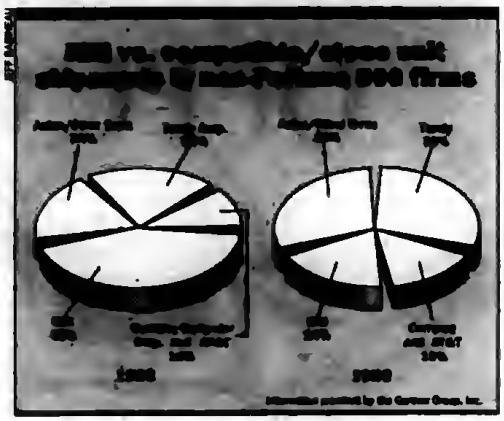
> *'Clones are a little like the scare with Japanese automobiles in the '60s. They're plentiful, cheap, but they don't have extensive support. Chances are, they'll work just fine, however.'*
>
> **— Doug Cayne Gartner Group, Inc.**

Clone vendors generally dismiss the concern about inadequate service and support by pointing to the reliability of the machines and the fact that there has to be some trade-off with the bargain basement prices. Others say service is not that bad.

Michael Dell, chief executive officer of clone maker PC's Limited, says his firm gives a 30-day, money-back guarantee on its machines, unlimited toll-free telephone support during regular business hours and a one-year warranty on parts.

Should a computer prove defective, Dell says, it is shipped back to the company's Austin depot for service. If there are complications with components, PC's Limited will replace them with equivalent parts from an existing inventory instead of trying to repair them. Dell claims his company makes an effort to get repairs turned around within three days.

Dell and his firm are riding very high and visibly on the crest of the clone phenomenon. Carrying little of the overhead associated with the larger compatible makers, Dell says, PC's Limited is shipping about 5,000 clones a month. He says he expects his company to reach $80 million in sales in 1986 and claims his firm can have a revenue of $150 million in 1987.



Dell is realistic. He says he believes, as do many others in the industry, that IBM is planning an assault on the clone makers. He does not buy IBM's intimations that the low-end PC market is now an unseemly mud wrestling match, not worth the marketing effort.

"IBM will be coming out with a whole new set of machines that could make it difficult to get a BIOS at Phoenix, chips at Intel Corp. and other parts [then], wham, put together a machine as easily as you can now," Dell says. "A lot of things in the new IBM machines are going to be proprietary, out of bounds."

David Thomas, an associate analyst at Hambrecht & Quist, in New York, agrees. "IBM is streamlining production at its [new, robotized] Austin plant, producing low-end PCs to compete in price with the clones. There is a good chance IBM will also become more proprietary. This strategy will make it difficult for clone makers to put machines together without a lot of research and development thrown in. That means a lot more money and personnel. Most clone makers are going to be squeezed," Thomas says.

Gartner Group's Cayne adds that he is confident IBM will take dead aim at the clone makers soon by introducing two Intel 80286- and 8088-based PC models priced well below current IBM models. These products will no doubt be further discounted by retailers.

Even among users, the tendency is to keep a close watch on what IBM does.

"IBM is a big factor for the future of PCs and for what we do," Helene Curtis' Braun says. "They're tried and true."

Other factors could make life difficult for the clone makers. More and more, the emphasis in offices is toward connectivity of PCs, away from stand-alone functions. This pattern can only dim the lights on clones that have little to offer beyond stripped-down, stand-alone processing.

Ominous rumblings can also be heard on the more esoteric front of international economics. Some of the countries where clones and components originate, such as South Korea and Singapore, have their currencies pegged to the U.S. dollar.

"That means that their currencies don't fall or rise against the U.S. dollar," Hambrecht & Quist's Thomas says. "So the recent devaluation of the U.S. dollar is not going to affect their trade with us. Their products remain at the same price levels against the U.S. dollar. Within the next year, Washington, D.C., is going to put some pressure on these countries to unpeg their currencies."

The big crunch, however, could come from the old story of too many machines chasing too few customers. Low-end clones are now perceived as a commodity market in which almost anyone with a little capital and technical savvy can enter and get rich quick. Even more established companies are being sucked in, fearful of losing out on a good thing.

Computerland Corp. and Businessland, Inc., for example, both major computer retail chains, have slapped private labels on Asian machines and are hocking them alongside the staid IBM and Compaq labels. Hyundai is marketing a clone through Caldor, Inc., a New England department store chain, and Sears, Roebuck and Co. will soon be selling Franklin Corp. clones. The PC has joined the age of mass merchandising.

Healthy market outlook

But for now, at least, the PC compatible and clone markets look healthy. The Gartner Group has bumped up its PC unit shipment projections for 1986 and 1987 "due to the fact that low-priced clone manufacturers are becoming important PC suppliers and are expanding traditional PC distribution."

The research group projects Asian and U.S.-based clones to account for 1.84 million units out of a total U.S. market of 6.3 million PCs shipped this year, a jump of 43% over last year's figures.

In 1987, however, the Gartner Group sees things starting to slow down. The firm forecasts 2.15 million units will be shipped from U.S.- and Asian-based clone makers, out of a total of 7.4 million units. This figure still represents a 16% climb in clone units shipped this year. Still healthy, but the brake will be on.

"I think almost everyone agrees that IBM will increase its market share against the clones down the road," Thomas says. "But there will always be clone makers. There will always be the low-end Amdahls."

Kolodziej is a Computerworld Focus *senior writer.*

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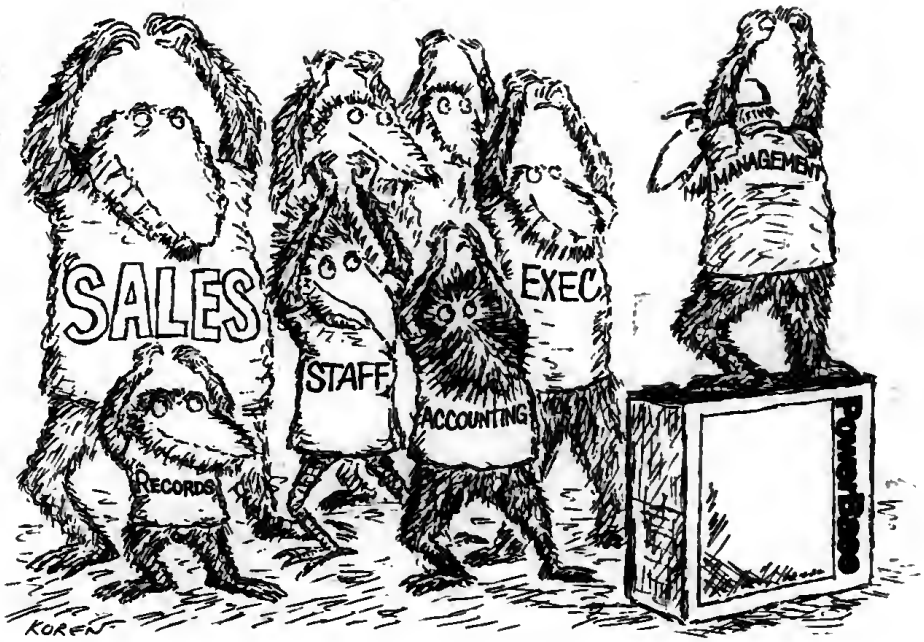

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"When trying to reach VAX users, Computerworld gets results."

R. Stephen Lilly
Director of Marketing
Computer Information Systems
Braintree, MA

Steve Lilly, Director of Marketing for Computer Information Systems (CIS), had set a clear enough goal: he wanted to introduce CIS' system management software, Quantum RS, to the marketplace and explain how it is used for VAX resource tracking, capacity planning and resource/cost allocation.

Steve delivered his message in Computerworld as well as in other trade publications. He quickly discovered that Computerworld does, indeed, get results. *"Computerworld has helped CIS reach its target audience — the decision-making systems managers who are current and future users of VAX systems,"* he says. *"Basically, Computerworld readers are serious buyers; if they inquire about a product, they're a viable lead — and often a sale."*

Steve is sure about this because CIS tracks its leads with an in-house marketing system.

"We've found that Quantum RS generates a tremendous amount of interest, but CIS' sales department is dependent on the quality — not quantity — of responses. And we know Computerworld delivers quality — which added to Quantum RS' sales increase of 218 percent last year," Steve says.

One reason CIS has relied on Computerworld over the last two years is Computerworld's diverse coverage. *"Computerworld covers the industry. Today's corporate DP shop is more of a mixed-vendor environment than it was in the past. In growing numbers, corporate users are utilizing IBM PCs and ATs for microcomputing and DEC VAX systems for departmental and mainframe computing,"* notes Steve. *"Based on this, we've found Computerworld to be a very effective vehicle to reach VAX users, especially in large DP environments."*

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SUPERMICRO OUTLOOK

Connecting The Corporate Network

MIS may find the solution to systems integration woes in the multiuser supermicrocomputer.

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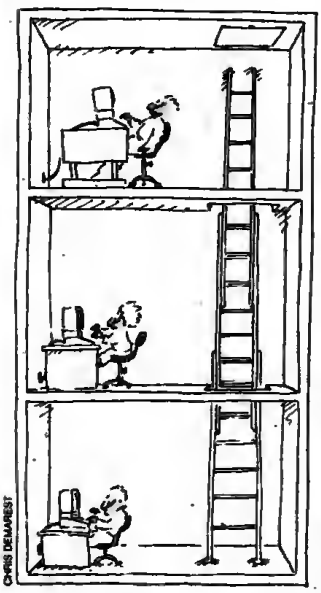


CHRIS DEMAREST

One of the greatest obstacles confronting MIS management as it develops a departmental computing environment is the challenge of connecting the corporate network.

Most MIS departments are searching for solutions to integrate their systems. Until recently, the headaches of sporadic growth, hardware incompatibilities and data distribution had few satisfactory remedies, and MIS had to focus on solutions that offered the lowest common denominator of drawbacks.

The development of the multiuser or departmental supermicrocomputer, however, offers a viable alternative for MIS.

The new generation of supermicros can provide the important link between desktop personal computer applications and corporate mainframe data base systems. Supermicros have the capability to integrate departmental personal computers into a cohesive local-area network (LAN) by providing file and printer serving functions as well as mainframe gateway utilities. From a budgetary viewpoint, supermicros even approach small mainframe performance at a fraction of the cost.

Supermicros can solve networking problems such as the loss of computing resource control, uncontrolled file transfers, rising teleprocessing costs, deterioration of traditional application performance and incomplete chargeback systems. These machines allow applications and data bases to be maintained at three distinct levels in the organization — centrally, in each department and at each desktop.

While acting as the "glue" between the mainframe and desktop environments, the supermicro system can also provide multiuser applications at the departmental level. This ability enables the department to maintain full control over its own data bases.

In the ideal corporate network, the user would be unaware of the nature of the physical and logical connections between the various computers. For example, it should be possible for the user to switch painlessly between several concurrent applications. These applications could reside on the desktop micro, the local supermicro, a remote supermicro and a remote mainframe. Furthermore, it should be possible to move files between the different applications in a consistent fashion so the user views the various applications as an integrated set.

To accomplish this feat, advanced networking and user interface software are needed to manage the system while shielding the user from underlying complexities. This is exactly the kind of software that supermicros provide. For example, a supermicro that offers a menu-driven window interface to Unix, integrated with Microsoft Corp.'s MS-DOS, enables multiple applications on different computers to be accessed simultaneously from a single desktop micro.

The MIS manager is faced with many decisions in implementing a corporate network. Of special concern are the physical connections and the protocols the network supports. These are areas in which firm industry standards are badly needed but have yet to be fully established. IBM is pushing hard with its Systems Network Architecture (SNA) and Token-Ring network, but there are other alternatives that may also prevail. The supermicro is able to support multiple standards and quickly support new ones as they become established.

There are two emerging supermicro physical interconnection standards in the commercial environment: Ethernet and the IBM Token-Ring. These two standards are also used to connect supermicros to desktop computers, but they compete with a less costly, more traditional method — RS-232 cable.

Ethernet and the IBM Token-Ring are the leading players in the LAN market. The Yankee Group, a Boston-based market research firm, estimates that by 1990 about 40% of this market will be owned by the Token-Ring and 30% by Ethernet. The remainder will most likely be owned by AT&T Starlan and LANs from small, specialized networking companies.

The mainframe-to-supermicro physical interconnection standard is governed by the connection methods provided by IBM mainframes. The most popular, all supported by supermicros, are via the IBM 3720-type front-end processors. The processors provides modem-based connection over telephone lines, direct connection via 56K bit/sec. lines and connection over the Token-Ring LAN.

Each different physical connection tends to be associated with

SUPERMICRO OUTLOOK

different standardized software protocols. Ethernet usually supports the Transmission Control Protocol/Internet Protocol. The IBM Token-Ring is mainly used to link IBM Personal Computers and, therefore, is integrated with the MS-DOS networking protocols. Direct RS-232 connections are generally based on ASCII terminals but often carry proprietary protocols for functions like file transfer. Remote mainframe connections are mainly synchronous and predominately carry SNA protocols, although international standard protocols such as X.25 are also common.

IBM's SNA supports many different levels of functionality that are utilized by supermicros to provide new capabilities. For example, support of the IBM 3270 terminal protocol enables desktop micros to access IBM mainframe applications over simple RS-232 cable. But the most important benefit is provided by the integration of SNA protocols with the distributed file systems supported by most supermicros.

These distributed file systems, namely, Sun Microsystems, Inc.'s Network File System (NFS) and AT&T's Remote File System (RFS), enable files to be distributed transparently among supermicros and desktop micros. This enables supermicros to act as file servers for a collection of desktop micros.

SNA also provides data distribution services like SNA Distributed Services (SNADS). However, SNADS only provides file transfers, unlike the supermicro/desktop environment in which data is accessed a record at a time across the network. The SNA capabilities that support data distribution are becoming increasingly dependent on the new LU6.2 protocol that supports application program-to-program communications. By integrating support of this protocol with a distributed file system, supermicros are able to provide easy access to data anywhere within the corporate network.

A supermicro connected to desktop micros via the IBM Token-Ring enables the supermicro to act as a full resource server to the desktop micros, but in some situations, this approach may be unnecessarily costly and complex. Simple requirements can be met by low-cost RS-232 connections between the supermicro and desktop micro in a traditional star configuration. For example, the Token-Ring together with MS-DOS networking enables the supermicro disk to be shared among desktop users as if it were a DOS disk, the advantage being that it yields a multiuser capability. However, the supermicro with RS-232 desktop connections delivers a much more powerful multiuser capability, and it can still be utilized from a desktop micro without losing the ability to run MS-DOS programs.

The RS-232 connection between supermicros and desktop micros may be important for MIS managers who are not ready to commit to one of the major LANs. The combination of this style of connection with modem-based connections between the mainframe and the supermicro represents a low-cost, low-risk first step in implementing a corporate network.

A typical scenario for implementing a corporate network would involve one or more departments in a large corporation that has a centralized MIS department running IBM mainframes. Each department might have several desktop micros running single-user applications. The department managers may wish to access the mainframe data base and implement multiuser applications within their own department.

Three key technologies for corporate networking in such a scenario may be identified as IBM cluster controllers with an IBM Token-Ring network; supermicros with an Ethernet interface; or supermicros with RS-232 connections.

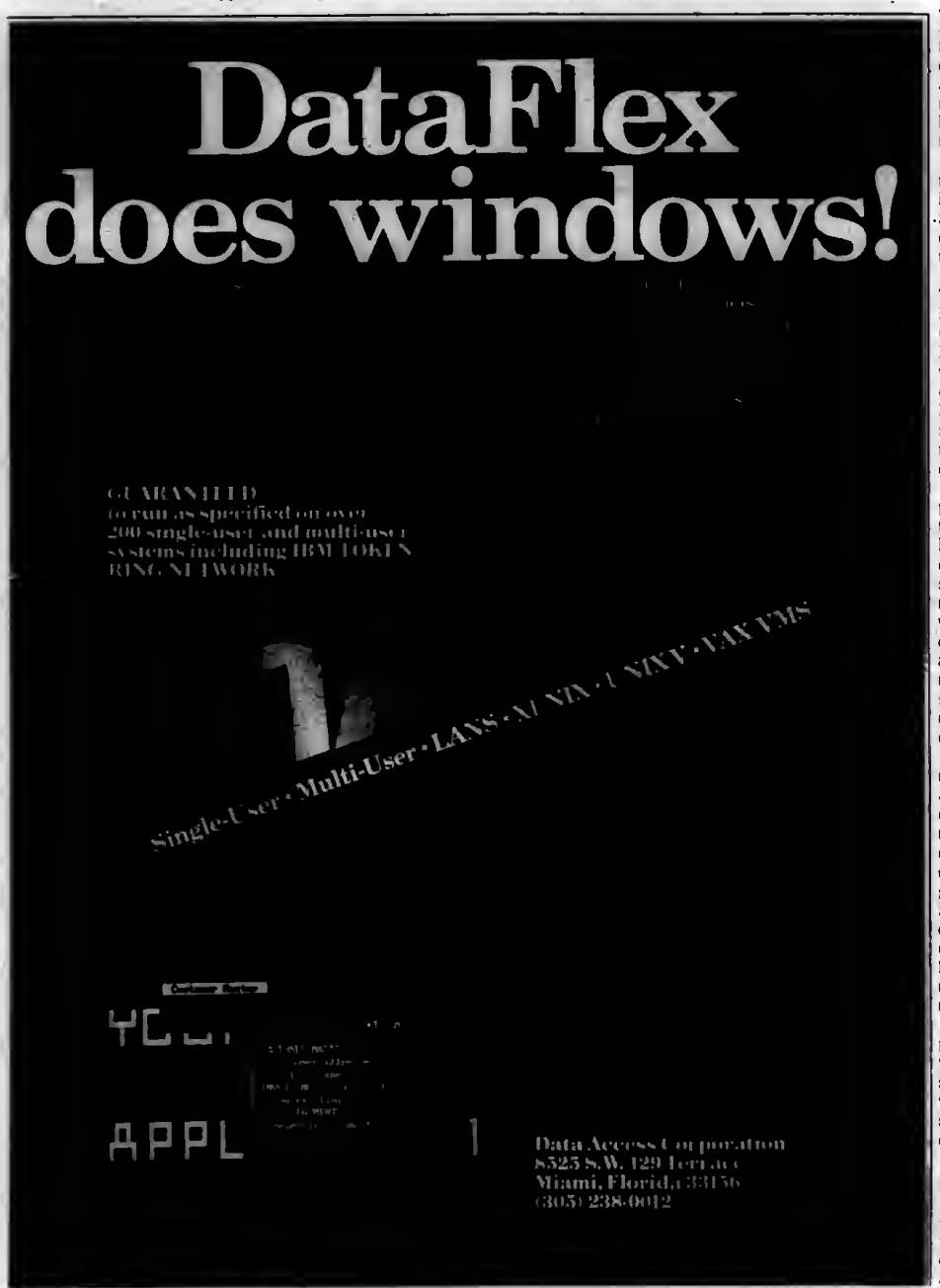
IBM cluster controllers with an IBM Token-Ring network would be taken if a key requirement is to extend the single-user applications to multiuser versions. In this situation, the desktop micros would be connected to an IBM communications cluster controller via the Token-Ring. The multiuser applications would run on the desktop micros with one or more of them acting as file servers. This choice is the most costly.

The supermicros with Ethernet approach would be appropriate if the multiuser applications at the departmental level are large, complex and require interdepartmental communications. In this situation, the desktop micros are connected to supermicros via Ethernet, which also interconnects the supermicros. One or more supermicros would act as the gateway to the mainframe. The multiuser applications would run on the supermicros while the single-user applications would continue to run on the desktop micros.

The third, and least costly, approach makes sense if the multiuser applications at the departmental level are complex but do not require interdepartmental communications. In this case, the desktop micros would be connected to the supermicro using RS-232 cable that acts as a gateway to the mainframe. The multiuser applications would run on the supermicro. Because the transition from supermicros with RS-232 to supermicros with Ethernet is very easy, it provides a convenient growth path as communications needs change.

Today's supermicro technology supports a wide variety of cost-effective network connections. In putting together a strategy to implement a corporate network, the MIS manager can expect the supermicro to provide the needed degree of network flexibility.

Watkins is director of software engineering at Datamedia Corp. in Nashua, N.H., a manufacturer of 32-bit supermicrocomputers and desktop computing products. Watkins has more than 17 years computer industry experience.



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SELECTION STRATEGIES

DBMS: A Matter Of Taste

BY · GARY · DODGE ·

In these days of tight budgets and scrutiny by top management, MIS managers need, more than ever before, to purchase microcomputer data base management products with the best price/performance. Throw in the critical nature of data for most corporations, and the choice becomes even tougher.

Selecting data base management system software for micros is also constrained by time and staff resources. Because MIS may have only a few days or weeks to evaluate and select a product, it is generally not reasonable to devote several employees and tens of thousands of dollars to select a $500 software package.

All hope is not lost, however. Below are the pros and cons of several approaches that MIS often uses to help make its DBMS decision.

■ *Buy based on reviews in the press.*

Magazines, newspapers, newsletters and other media devoted to personal computers, especially those dedicated to a particular brand or operating system, frequently perform comparative tests of DBMS software.

Reviews can provide data that a buyer can use to rate each product. Compiling this data with vendor specifications, published financial reports and hands-on use of the software can give a buyer information to rate products against each other.

Reviews also enable the selection team to eliminate from consideration any products lacking critical features. Furthermore, these reviews can bring to light features that the buyer may want to add to his requirements list.

There are risks, however, in purchasing a DBMS based solely upon a review in the press.

Magazines and the like must review products from a very general, objective point of view. Your set of needs is more specific based upon your applications, your users and your business.

Because a large number of products are usually included in reviews, results are commonly reduced to tables of yes/no answers or simple numeric values that hide nearly all of the hands-on feel of the software. Also, reviewers must often report vendor specifications without explicit testing.

■ *Buy based on the recommendation of an information center.*

If your company has an in-house information center or similar group, the center may have done extensive testing of DBMS products and chosen one or a few that they can recommend, support and sometimes even supply.

Ted Smith, now senior technical director at U.S. West Advanced Technologies, formerly managed Mountain Bell's Microcomputer Resource Center. The resource center staff could only recommend and assist in procurement; it could never prevent the purchase of an unsupported product. Smith reports that nearly half of the center's early clients required DBMS assistance. Nearly all the clients who followed the center's recommendations found successful solutions; the most common failures happened among clients who had

preconceived notions about the product they wanted and who chose to ignore recommendations by the center.

One group, against the suggestions of the research center, purchased 30 copies of a stand-alone, unsupported DBMS and wrote a custom interface to extract mainframe data. Halfway through development, the group lost its programmer, and, without the research center's support, the application was never completed.

There are, however, risks associated with depending solely upon your information center's advice. Verify with other clients that the information center staff is strong in number and has the qualifications to recommend the right product to meet your needs. Find out if the center will solve any problems that arise should the product not be a perfect fit.

Salt Lake City-based Questar Service Corp. operates an information center offering a balance of mainframe and microcomputer software along with training and application support. According to Dale McKinnon, Questar's information center supervisor, the center has not yet done a formal evaluation of microcomputer DBMS programs.

However, due to strong user demand, the center has had to provide an interim PC DBMS solution, pending a final solution.

The center's choice, Software Solutions, Inc.'s Dataease, is easy to learn, relatively powerful and very intuitive, McKinnon says. But he also reports that it is somewhat limited in flexibility.

Max Bylund, senior information center consultant at Questar, echoes McKinnon's observations. "It isn't the perfect product; there are some things it can't do. But if it meets the needs [of] 90% of the users with minimal required support, then great."

Bylund says that many applications have been successfully developed using Dataease, but a few others have not had such happy results. One application for Questar's records management group had capacity problems under Dataease; with assistance from the information center staff, the application was moved to D&B Computing Services, Inc.'s Nomad2 mainframe DBMS.

In another case, an application, which should have utilized a multiuser, network DBMS, was developed using Dataease. As a result, the application has been plagued by problems of data validation and integrity. The 2-year-old system is now considered a prototype that will eventually have to be rebuilt; meanwhile, the information center is making it work.

■ *Buy based on the recommendation of a retail store.*

No software dealer can carry every micro product; most retailers limit their offerings to products they can sell profitably and support adequately. Slow-moving products make for expensive inventory. Extensive training costs are involved in training employees about each new product.

J. B. Leep, director of product development for Businessland, Inc., a national microcomputer retailer based in San Jose, Calif., describes Businessland's approach to product selection as a balance between technical and marketing concerns. His product support group evaluates features and compatibility with other supported products like local-area networks. After selection, his group provides a centralized, technical support service to field sales staff.

Leep says there are various concerns,

> *If a DBMS sells the most, it must be the best, right? Not necessarily.*

other than technical ones, that influence his company's choice of a product. "An otherwise perfect product from a vendor that can't [provide] support is not a perfect product. As a company, we have to consider packaging, pricing, documentation and the potential market for the product. The user determines a successful product," he says.

Product buyers should keep in mind that a sales representative is exactly that — one trained to sell a product. In many cases, his product knowledge is limited to the training provided by the vendor. A sales representative rarely develops complex applications using the data base products he sells. Recognize that he is trained to help determine your needs and satisfy them. A sales representative may be good at what he does, but he is not a professional systems developer.

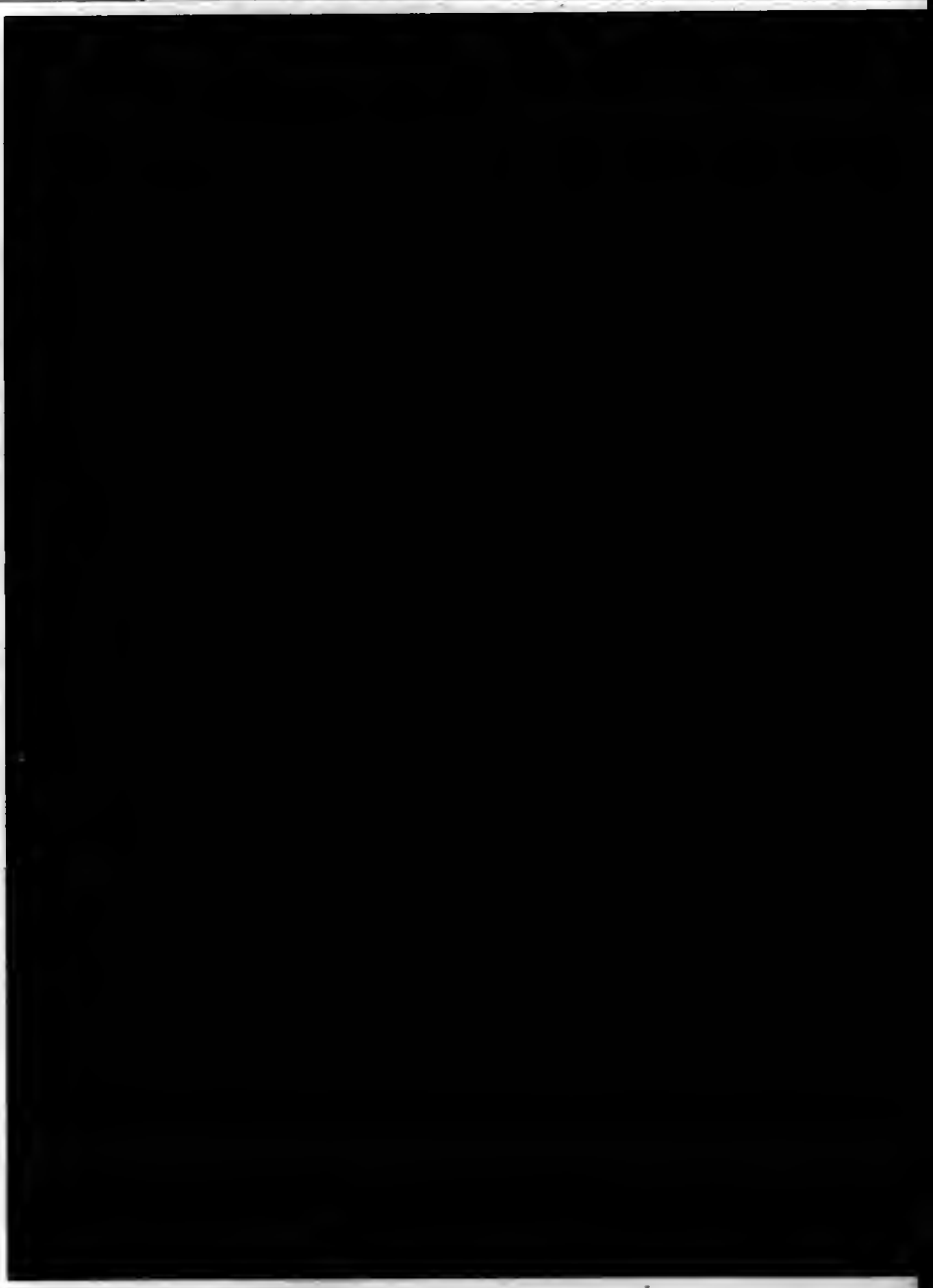
Be sure to check out the introductory and supplemental training a retailer provides for a product. Ask whether the retailer can direct you to consultants with extensive experience in the DBMS that has been recommended.

■ *Buy based on the advice of a consultant.*

Employing a consultant to help you select a DBMS is generally not cost-effective unless the business risks associated with making a bad selection are extremely great or unless your budget can handle the cost.

The ideal consultant will have a good knowledge of several products, not a great knowledge of one. An expert on one product can be useful at the DBMS implementation stage, after you have made your purchasing decision.

Consultants can, in certain situations, save you much more than they cost. Find one or two whom you trust and use them when appropriate.



SELECTION STRATEGIES

■ *Buy based on popularity.*

If a DBMS sells the most, it must be the best, right? Not necessarily. This belief becomes a self-perpetuating fallacy because retailers stock and recommend what will sell best, many consultants specialize in areas where there is work and magazines keep readers informed about products that most of their subscribers use.

The most popular product may not necessarily be right for you. However, there may be distinct advantages in choosing a popular program, as long as it fits your needs. You will be more likely to find an OEM, aftermarket vendor, retailer and consultant assistance for an industry-standard DBMS than for one that is considered an industry maverick.

■ *Buy the "best," that is, the most expensive product or the one with the most features.*

This step is the coward's approach to requirements analysis. It assumes that buying the most features will probably meet the most needs. The time saved is likely to be consumed in training users about unnecessary bells and whistles, however. Learn your expected usage, and buy appropriately.

■ *Buy one of each.*

This solution is generally not recommended. Until this past summer, I might have included this suggestion only as a joke. However, I recently encountered a municipal governmental agency that apparently found itself approaching the end of its fiscal year with extra money. Rather than *not* spend the money, it bought several copies of several DBMS packages, several word processing programs, several spreadsheets and so on. Most of those programs are still sitting on a shelf in the computer room.

> ”
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> *You will be more likely to find support for an industry-standard DBMS than for one that is considered an industry maverick.*

This approach is recommended to those organizations that have unlimited time, budgets and staff like major retailers and large corporate information centers that evaluate new products.

■ *Buy the PC version of a mainframe DBMS.*

Some mainframe DBMS vendors' products, specifically those providing fourth-generation decision support tools for the information center environment, have subsets of their mainframe data base languages running on microcomputers. Oracle Corp.'s Oracle, Information Builders, Inc.'s Focus and Nomad2 have been ported to the microcomputer environment.

Generally, this approach would only be reasonable if recommended by your in-house information center, which currently provides the same system on the mainframe.

The principal advantages to this approach are in facilitating data movement between the two environments and in reducing the need for training users in multiple products.

For the stand-alone PC user, this solution can be costly. The PC version of a mainframe product may be slower than programs originally developed in the microcomputer environment because of the overhead incurred in duplicating the mainframe product's features. Additionally, this type of product is no more likely than any other to fit the needs of any particular application.

■ *Buy based on product advertising and packaging.*

Those who choose this approach should contact me as soon as possible; I have a great deal on some beautiful lakefront property.

■ *Do not buy. Use what is already available.*

I have witnessed the birth (and painful death) of some amazing applications built using common spreadsheet programs and word processors. My favorite was a spreadsheet application that required four separate data files to hold all the records because each file had to fit within available random-access memory. Each time the records had to be sorted, each file had to be loaded, sorted and then split into four new files.

The 16 new files then had to be recombined, four at a time, resorted and saved. Because the resultant four files often had key range overlaps, several records typically had to be split off each end then recombined and resorted with others of the same key range. The total time to make a single key sort? More than two hours of computer and user time is required. Converting this particular application to an appropriate DBMS required less than three hours. Sorts now take approximately 12 minutes (unattended), and reports no longer require manual calculation of grand totals. Moral: If the shoe doesn't fit, don't wear it!

MIS should be prepared to invest the appropriate time, money and people to find and learn to use the right tool to solve business problems. While it is possible to pound screws into a board using a hammer, it is much more efficient, much safer and much more reliable to use the correct tool in the correct manner. ■

Dodge is a supervising consultant in the Denver office of accounting firm Coopers & Lybrand. He also serves as educational vice-president for the Mile High Chapter of the Data Processing Management Association.

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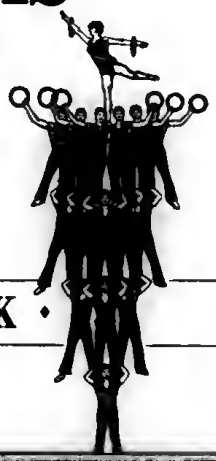
PEER-TO-PEER CONNECTIONS

Supporting Peer-To-Peer Connections

A closer look at E-mail can provide insights into the benefits of PC networks.



• BY • ANDREW • CLARK •

The peer pressure is on in the computer industry.

Peer-to-peer connectivity has gained attention recently with IBM's acceptance of a peer-to-peer connection in its Systems Network Architecture networking environment. Using such technology as LU6.2 and PU2.1, Big Blue has brought the Personal Computer and standalone minicomputer into its networking environment.

The benefits and goals of peer-to-peer connectivity are important considerations for MIS and users. What does it mean for a personal computer to be involved in a peer-to-peer network? What benefits could a peer-to-peer network bring?

We can best explore the benefits of peer-to-peer networks by looking at the electronic mail environment, an environment that for the most part has not been recognized as an implemention of peer-to-peer technology.

E-mail service relies upon a type of software known as a PC user agent. A PC user agent diskette is based upon the X.400 message handling protocol and allows a PC to communicate with central minis or mainframes.

Currently, more than 10 public E-mail services exist in the U.S. Each of these services runs on centralized minicomputers and mainframes. Traditionally, users dial up the mail service through a public packet-switched network, input messages into the mail service and read messages that are deposited in their electronic mailboxes. Users go on-line with either an ASCII terminal, a word processing device or a personal computer.

In these instances, each unit acts as an I/O device for the central host — a terminal-to-host link. Recently, however, some E-mail vendors have made a PC user agent package the method of choice for accessing their service, including General Electric Information Services Co. with its PC Mailbox software, AT&T with its Access software and Western Union Corp. with its Easylink software. The objective of the PC user agent is to take advantage of the local intelligence of the PC to offload much of the processing traditionally done by the host CPU.

The PC user agent allows the PC user to accomplish a number of tasks locally. First of all, the user agent provides a word processing interface. This interface allows users to create messages off-line using a word processing environment and not the traditional line editor found on the service's minicomputer or mainframe. Second, the user agent allows the PC to automatically dial up the service to transmit messages created off-line and pull down messages found in the mailbox. This routine can be automated so the PC can perform these tasks unattended.

Third, the user agent enables the transmission of messages using an error-checking protocol to ensure that messages are transmitted correctly. Fourth, the software allows users to transmit binary PC files via the E-mail service. Fifth, it provides a local directory of addresses.

The PC user agent is an implementation of the remote job entry computing process. On closer analysis, however, it is much more. The following list of benefits will show the user agent as an implementation of peer-to-peer networking.

■ **User interface.**

One of the biggest cycle stealers on a host is a full-screen user interface. In fact, supporting a full-screen word processor in a terminal-to-host arrangement steals almost 50% to 75% of the CPU's power. It is impractical in an E-mail environment to provide that kind of user interface unless a user

PEER-TO-PEER CONNECTIONS

utilizes a PC user agent.

This user interface is perhaps the most important advantage of the PC user agent. It allows users to create messages in the same manner in which they use a word processor.

Although the user agent's word processor is generally not as sophisticated as a full-bodied, full-featured word processor, it has all the necessary functions that allow the creation of simple messages. Important functions include the Up/Down cursor keys, the Delete key and the capability to insert.

Uses familiar keyboard

These functions are as sophisticated as the word processor gets. The word processor typically uses only standard keys found on an IBM Personal Computer keyboard so there is no need to learn any new key sequences to use it. Users familiar with word processing can sit down, immediately create a message and send it.

Because it is not effective to provide full-screen word processing in the terminal-to-host arrangement found in a traditional E-mail environment, a peer-to-peer connection offers an implementation that had been unavailable to this point.

Beyond the word processor, however, the entire user interface provides an intuitive environment. To operate the user agent, a user just points and shoots using the cursor or function keys. All options are on the screen. A user can run the user agent without ever reading a manual. These functions cannot be done using a traditional terminal-to-host connection.

Although vendors have taken great strides to improve their user interfaces, the user interface of such a connection cannot be equivalent to that found on a personal computer.

A full-bodied user interface almost requires a dedicated CPU. A mail service could not effectively or economically provide this type of user interface in a terminal-to-host environment.

■ **Automated communications session.**

The second advantage of the PC user agent is an automated communications session. The PC user agent automates the logon sequence, including the submission of phone numbers, passwords and so on. However, beyond an automated logon sequence, the user agent also automates the entire communications procedure.

For example, the user agent can be ordered to automatically dial up the E-mail service at certain times to submit messages and pull down messages. This process can be done entirely unattended. The benefit is that communications can be done during off-peak times to take advantage of excess communications capacity and discount on use.

■ **Error-correction protocol.**

The third advantage of a PC user agent is that it provides an error-correction protocol with error checking during the transmission. The PC user agent supports one of the standard error-correction protocols such as Xmodem, Tymnet/McDonnell Douglas Network Systems Co.'s X.PC or Microcom, Inc.'s Microcom Networking Protocol.

By supporting one of these standards, the user agent ensures that messages are sent without errors. In a traditional terminal-to-host environment, a user must go to the additional expense of buying a modem that supports the error-correcting protocol or he will not receive this kind of error correction. Again, the power of the PC CPU comes into play.

■ **Binary files.**

Because the PC is able to manage the error-correction process, it is also able to manage transmission of binary PC files. The binary PC file format is the method that such programs as Lotus Development Corp.'s 1-2-3 use to store their data files.

When sending binary files, a user must ensure that not a single "1" or "0" is out of place when the file is sent, otherwise the whole file is worthless. In traditional ASCII communications, files or communications are much more tolerant of errors.

The user agent automates the entire process of sending a binary file. The user, when creating a message, simply appends a binary file to the message, and when the user agent goes on-line to the host, the software pulls a binary file off of the disk and sends it. All communications utilize the error-correction protocol, which ensures the integrity of the file.

The benefit is quite obvious: A user can use a central E-mail service to send Lotus spreadsheets and the like throughout the country and the world.

■ **Local directory of addresses.**

On-line directory searches to determine addresses is another thief of host cycles. By maintaining a personal directory or a subset of the main directory off-line in the PC, messages can be addressed off-line with the user agent.

The user agent can also submit directory searches to the host more efficiently than traditional on-line searching. Users who do not know the proper address can request the user agent to submit a directory search to the host, which it then does.

What makes the user agent *special*, however? Users can achieve the benefits above using a communications package like Microstuf, Inc.'s Crosstalk. Crosstalk provides error correction, automates the logon sequence and can upload files or upload text that has been created off-line; users can perform all these tasks on the PC without a PC user agent.

But in a strict sense, current communications software cannot do what a PC user agent does. The PC user agent achieves a tight communications link between the host program and a local PC, and this tightness is the defining characteristic in a peer-to-peer environment.

The real advantage of the user agent is that it minimizes the number of host CPU cycles spent on each E-mail session.

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PEER-TO-PEER CONNECTIONS

Traditionally, each E-mail session involves a very small amount of data but a large amount of connect time. The better the user interface, the more CPU cycles are required.

The time spent on an E-mail session can be measured in blocks of 10 minutes to create and send a simple 1,000- to 2,000-character message. In this session, fewer than 2,000 bytes and 20 seconds of data have been sent, but the session must be supported for upwards of 10 minutes.

Communications lines must be open for 10 minutes to a front-end controller, and a front-end machine or host must manage the user interface for at least 10 minutes. This process is a waste of host resources.

The PC user agent makes much headway in economizing the scarce resources of the host. The communications session is reduced from minutes to seconds. The user interface need not be supported by the central CPU.

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> *The overriding goal should be to use underutilized desktop MIPS.*

The user agent expends the PC's amount of million instructions per second (MIPS) to support the user interface, to manage the communications session and, most importantly, to send the messages during off-peak hours.

If 50% of an E-mail service's messages could be sent and received during off-peak hours, the service's computing capacity could be more than doubled without any additional investment in hardware. The economies to be realized are almost astounding.

This is the overriding benefit of a peer-to-peer network: It takes advantage of the large, installed base of PC MIPS to offload some of the processing currently done on host CPUs.

Weak points

However, there are some weak points in the user agent model of a peer-to-peer network. For example, the user agent communicates with the host on a dial-up basis over a public packet-switched network at speeds of 1,200 bit/sec.

In a private peer-to-peer network, peers will communicate at higher speeds of up to 10M bit/sec. and 16M bit/sec. in a local-area network environment, allowing larger volumes of data to be transmitted.

In general, though, the PC user agent model does depict a peer-to-peer environment in an acceptable manner. The PC handles all interaction with the user, while the host manages central storage and network communications.

The host also handles security by maintaining passwords and usage logs. Security and data integrity will become the most important functions of the host. In this situation, the PC does what it does best, and the host is free to do what it does best.

Don't lose sight of benefits

It is important that computer professionals do not become so enmeshed in technical jargon like LU6.2 and PU2.1 that they lose sight of the benefits and goals of peer-to-peer environments. The overriding goal should be to use underutilized desktop MIPS.

International Data Corp., a market research firm in Framingham, Mass., estimates that the number of installed PC MIPS outnumbers mainframe MIPS by a factor of 10 to one. In other words, for every mainframe MIPS, 10 underutilized desktop MIPS exist.

Computer professionals who can effectively make use of these desktop MIPS will see a dramatic increase in capacity. In E-mail, the PC user agent has provided geometric increases in capacity. Other systems should see the same results. ■

Clark is a consultant in the Houston-based Strategic Business Service Department of Walter Ulrich Consulting, a subsidiary of Coopers & Lybrand. His recent study focus has been on the incorporation of electronic mail throughout the U.S.

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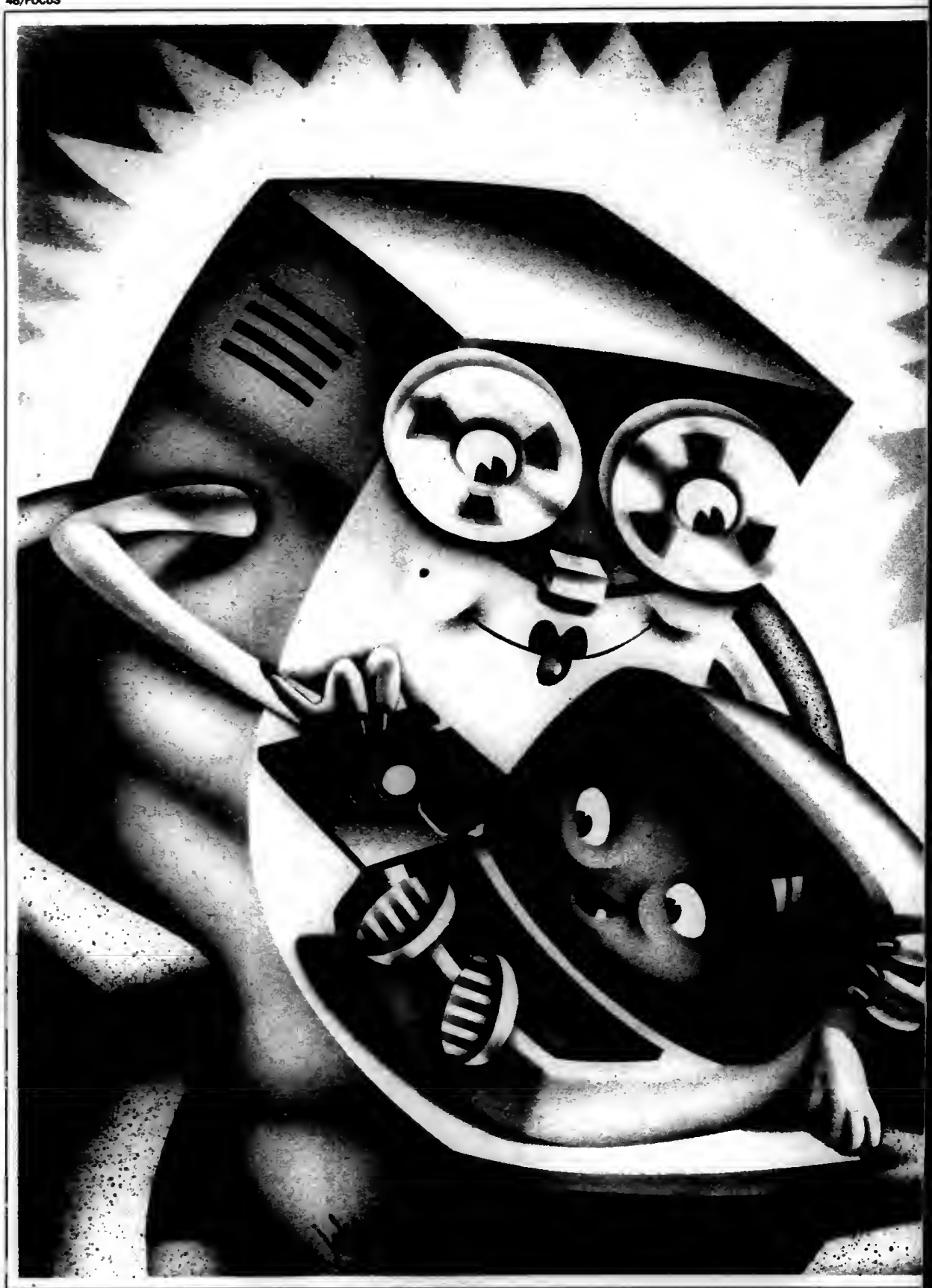

PC LAN UPDATE

Nurturing The Power Of PCs

·BY·CHARLES·ZIERING·

Remember the good old days when everything happened on the mainframe? The financial group got all its applications implemented because the data processing group reported to the chief financial officer. But other groups could only dream of automation because their applications languished at the wrong end of the DP backlog. Come to think of it, those days were not so good after all to those who could have benefited most from information processing.

Today, a lot has changed. A handful of personal computers collectively represents more CPU processing power than the mighty mainframe of a few years back. Dramatic reductions in cost have made the distribution of this processing power more affordable, and the horsepower dedicated to a single individual has paved the way for software that makes computers more approachable to non-DP professionals. All this has led to the widespread use of PCs in offices.

Given this installed base of PCs, small companies and work groups within large companies can reap two kinds of benefits by tying their PCs together with a local-area network (LAN). First, PC LANs permit users to share expensive resources such as disk drives or printers. Second, but more importantly, PC LANs permit information sharing that supports the operational activities of a work group.

Despite these advantages, PC LANs are currently the exception rather than the rule. What are the factors that are retarding the widespread acceptance of this compelling information processing architecture? Should we expect modest increases in PC LAN installations or major growth?

A number of problems have kept PC LANs from making significant market penetration to date:

- Installation and administration complexity.
- Lack of integration with operating systems.
- High costs.
- Lack of standards.
- Social issues.
- Lack of horizontal applications.
- Lack of application building tools.

It is important to look at these problems in the context of the expected benefits from installing a PC LAN. If the benefits are substantial, problems can be overcome.

Most groups that use PCs do so without the support of a data processing organization. In fact, one of the main reasons the use of PCs is so widespread is that they do not require such support. Most PCs are close enough to the plug-it-in-and-turn-it-on variety of office machines that non-DP professionals can effectively use them with minimal training. Unfortunately, that is not yet the case with most PC LANs. The installation and administration of most PC LANs requires a significant investment of time from a group that typically does not have the requisite skills and training.

If left unsolved, this lack of support will continue to prevent the widespread use of PC LANs. If third-party LAN vendors would work with PC manufacturers to make the LAN a preinstalled option when buying the PC, the ease-of-use problem could be significantly reduced.

Why are PC LANs not as intuitively easy to use and install as their PC counterparts? Much of the problem stems from the fact that networking should be an integral part of the underlying operating system. Apollo Computer, Inc.'s Domain for workstations is an example of an operating system built from the ground up with networking in mind. As such, everything works smoothly; no one thinks about the network as a separate component or tool. The network is packaged with the base machine, and all operations appear to the user as occurring in one unified environment.

In contrast, today's PC LAN vendors must layer their offerings on operating systems that were not built with networking in mind. Although most vendors could go a lot further to make their products user-friendly, they are faced with trying to provide the ease of use that PC customers demand.

Early PC LANs were sold primarily to enable the sharing of relatively expensive peripherals such as hard disks and letter-quality printers. With this motivation, it is very easy to trade off the cost of the LAN against the cost of these peripherals. Of course, the cost of administrating the LAN must be factored into the equation. Although the costs of PC LANs have been dropping, the costs of disks and printers have

PC LAN UPDATE

been dropping at a faster rate. As a result, justifying a PC LAN to cut costs often takes a backseat to the more intangible benefits of connecting a work group.

Because PC LANs will provide the foundation for many applications, the need for a standard is critical. Before the IBM Token-Ring standard was introduced, each LAN vendor had to develop proprietary protocols.

Now, vendors are falling in line with the Token-Ring, bolstering the PC LAN market. Although a standard is now being accepted to connect a homogeneous collection of PCs, there are other standard network protocols for connecting Unix machines, minis and mainframes. The ability to bridge different networks into a companywide network of heterogeneous machines has yet to be reached.

A subtle hindrance to the installation of PC LANs may be the PC users themselves. A user feels that a PC is his own. Whatever he puts on it is private unless he chooses to give a copy of it to someone else. With the possibility of networking and sharing data, users may develop an uneasy feeling that their PCs are no longer private.

At this point, PCs are used almost exclusively for personal applications, chiefly word processing, spreadsheet and simple list management. If this trend continues, the PC LAN outlook is bleak. When PCs are applied more to supporting the functions and operations of a department or work group, PC LAN use will flourish.

PC LANs lay the foundation for building department or work group applications. But to solve the application needs of these groups, further tools are necessary. PC LANs require the availability of good office automation systems and application building tools. OA presents the easiest first step to capitalize on networking a group's PCs. Though not likely to strategically improve the group's effectiveness, functions such as electronic mail and calendar management can enhance communication and save time.

The greatest potential benefit in a PC network is the support of a work group's mission. Work group applications can go far beyond the benefit of clerical cost reduction, significantly improving the effectiveness of the group and the quality of its accomplishments.

Consider, for example, a customer support organization. By automating the tracking of problem reports, the organization can increase the responsiveness of interacting with a customer by telephone. When a call comes in, the support person can quickly bring up the history of interactions, the status of the investigation and any other pertinent information. Meanwhile, the customer develops a strong sense that the organization is professional and caring.

Now the question arises: Who will develop or implement the application? One advantage to the widespread use of PCs is the plethora of software offered by third-party developers. Unfortunately, the wealth of single-user applications available for PCs today will not transfer well to a multiuser environment without considerable work by the application developer. Furthermore, most work group applications are fairly specialized, requiring either custom development or customization of a generic package. This leaves the job to the work group itself, with possible assistance from the MIS group or an outside consultant.

There are three major skills required to implement a PC LAN work group application: knowledge of the application; PC LAN administration ability; and data base/applications development ability.

Clearly, the members of the work group have the greatest familiarity with the application to be developed. Consequently, someone from the group should be appointed to spearhead the effort. This leaves the question of actually implementing the application.

Calling on MIS

Here, a number of approaches are possible. If MIS has resources available, these resources can be marshaled to assist. But the MIS backlog is growing. If the use of MIS resources were the only viable approach, it would seriously hinder the development of new applications.

Having someone from the group build the application has many advantages. The course of the project is directly under the group's control, and, as the inevitable need for change arises, the group has the capability to determine priorities. However, is it realistic for a group with potentially little or no DP experience to implement an application without outside help? This depends heavily on the software tools available.

One area in which many of these software tools fail is the handling of multiuser contention. For a non-DP professional (and even for many DP professionals), this facet is one of the most complex and error-prone items of application development.

There are a number of factors that have retarded PC LAN acceptance, but two stand out as holding the key to widespread use. The first step to success is to make the PC LAN's installation and administration as simple as the PCs it will network for non-DP professionals to implement. The second step is to increase the availability of applications development systems that make it feasible for work groups to build their own applications. If these come together, not only will the LAN vendors flourish, but departmental work groups will finally control their applications development destiny and reap the benefits of information processing.

Ziering is vice-president of development at Data Language Corp. in Billerica, Mass. Data Language sells applications development environments and relational data base management systems available on a variety of Unix and Microsoft Corp. MS-DOS micros and minicomputers.

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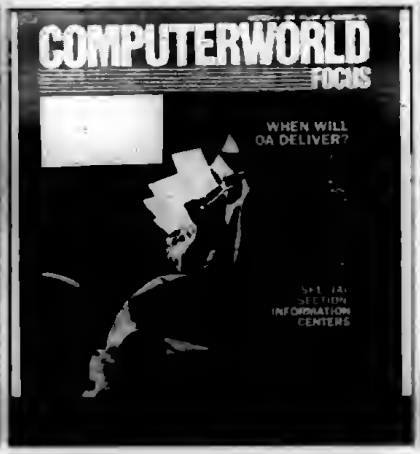

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Vendors
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11 ☐ Computer Service Bureau/Software/Planning/Consulting
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MICROCOMPUTER PRODUCTS

Wang Rolls Out Laptop

LOWELL, Mass. — Wang Laboratories, Inc. introduced the Wang Laptop Computer, a 14.24-lb unit that has a 13.9- by 11.9-in. footprint.

The portable reportedly was designed for users who need the full functionality of a personal computer.

Based on the NEC America, Inc. V30, which is a 6-MHz, Intel Corp. 8086-compatible CMOS processor, the laptop runs Microsoft Corp.'s MS-DOS 3.1 and is fully compatible with the IBM Personal Computer and Wang's VS-based machines.

Wang has reportedly tested more than 100 applications for the IBM PC that are fully compatible. Available Wang applications include Wang Systems Networking for $400 and Wang Integrated Word Processing for $385.

Built-in printer

One unique feature is a built-in, Epson America, Inc. MX-80-compatible printer. It operates at 18 char./sec. in burst mode with a print resolution of 180 dot/in. The printer can use plain paper with a snap-in thermal transfer cartridge or regular thermal paper.

The laptop also features a 27-line by 80-char. LCD screen; built-in, 10M-byte hard-disk storage; full-size, 92-key keyboard; expansion slot for a built-in modem; and a carrying case.

The ports it supplies include an RS-232 port, small computer systems interface (SCSI) that supports up to six optional SCSI devices, a monitor port for optional color monitor, two telephone ports, a numeric keypad port and an optional serial-to-parallel adapter.

The Wang Laptop is priced at $3,530 for a base unit, $3,895 for a unit with a 5¼-in. diskette drive and $4,048 for a unit with a 3½-in. diskette drive.

Laptop options

Several options are available. Users can purchase either a 360K-byte or 720K-byte diskette drive for $365 and $518, respectively. Two internal modems — a 300/1,200 bit/sec. model for $425 and 300/1,200/2,400 bit/sec. version for $795 — are available.

A 512K-byte memory expansion card costs $695, and a package providing Wang 2110 and Digital Equipment Corp. VT100 terminal emulation is priced at $200.

Wang, which considers the Wang Laptop part of its integrated product offerings, will only sell the portable through its direct sales force. The laptop will be available by the end of November.

For further information, contact Wang Laboratories, Inc., One Industrial Ave., Lowell, Mass. 01851.

Circle Reader Service Number 292

Intel 386-Based Systems Debut

SANTA CLARA, Calif. — Intel Corp. has announced four single-board computers that the company claimed increase the performance levels of Intel's Multibus architecture. All the computers are based on Intel's 16-MHz 80386 32-bit microprocessor.

Intel's 386-based systems offer 64K-byte, zero-wait-state cache memory.

The ISBC 386/21, ISBC 386/22, ISBC 386/24 and ISBC 386/28 single-board computers offer 1M, 2M, 4M and 8M bytes of 32-bit memory, respectively. The computers can be expanded to 16M bytes of memory through add-on modules that use surface-mount technology to permit more memory in less space. This increased memory, Intel claimed, provides users with direct CPU access to memory through a 64K-byte zero-wait state cache memory without having to go out over the system bus.

Intel said the boards employ a dual-bus structure: a 32-bit-wide bus for data transfers between the CPU, cache and dual-port memory and a 16-bit bus for transfers over the Intel Moltibus or ISBX bus. By using the two buses, Intel claimed, the boards take advantage of the high performance of the 32-bit 80386 processor while maintaining full compatibility with the Multibus architecture and the roster of more than 2,500 existing products based on it.

The single-board computers are slated for transaction-heavy applications such as financial stock trading workstations, real-time data acquisition and control and laboratory test equipment. They are supported by Intel's iRMX 286, Microsoft Corp.'s Xenix and AT&T Unix System V operating systems as well as any proprietary operating system written for Intel 8086 and 80286 processors.

The computers are priced at $4,800 for the 386/21, $5,970 for the 386/22, $8,310 for the 386/24 and $12,990 for the 386/28.

For further information, contact Intel Corp., P.O. Box 58065, 3065 Bowers Ave., Santa Clara, Calif. 95052.

Circle Reader Service Number 293

Apple IIGS Boosts Applications Speed, Links Appletalk Network

CUPERTINO, Calif. — Apple Computer, Inc. has unveiled the Apple IIGS, the newest member of the company's Apple II line of microcomputers.

The Apple IIGS has a base configuration of 256K bytes of random-access memory, 128K bytes of read-only memory (ROM) and eight expansion slots.

Built into the system are two serial ports, a jack for headphones or an external speaker and ports for analog red-green-blue and composite color video monitors.

Also included is the Apple Desktop Bus port for keyboard, mouse and other input devices and a disk interface for both 5¼-in. and 3½-in. disk drives.

The IIGS incorporates a communications chip that supports the company's Appletalk network, enabling the IIGS to use an Apple Laserwriter printer and connect with other Apple computers. The IIGS also contains graphics routines in ROM that make pull-down menus, windows and icons possible.

Nearly three times faster

Apple claimed that the 16-bit 65C816 microprocessor in the IIGS can drive existing applications nearly three times as fast as other members of the Apple II family.

The company added that IIGS core memory is expandable from 256K bytes to 1M byte through an expansion card and will eventually be expandable to 8M bytes with the development of additional Apple and third-party expansion cards.

The company also announced an enhanced version of Appleworks, its integrated software package.

Appleworks' Mailmerge facility enables users to combine information from a data base file with documents created with the Appleworks word processor.

Appleworks now automatically loads into Apple memory expansion cards each time the system is turned on, saving the user time and allowing the software to operate faster.

Takes advantage of extra memory

The company said the enhanced Appleworks package can take advantage of additional memory provided by Apple memory expansion cards for increased file sizes.

The Apple IIGS is priced at $999, and the enhanced Appleworks is priced at $250.

For further information, contact Apple Computer, Inc., 20525 Mariani Ave., Cupertino, Calif. 95014.

Circle Reader Service Number 294

IBM Unveils PC XT, RT PC Models In Flurry Of Micro Announcements

RYE BROOK, N.Y. — IBM has announced several products for the personal computer market including versions of the Personal Computer XT and RT Personal Computer, an update of AIX, Netview/PC, a 14-in. ASCII display station and ASCII terminal function cartridges.

The IBM Personal Computer XT Model 286 is based on a 6-MHz Intel Corp. 80286 processor with zero-wait states. It reportedly operates up to three times faster than earlier models of the PC XT in most applications. It also comes with 640K bytes of memory expandable to 12.6M bytes.

Standard features of the Model 286 include a half-height, 1.2M-byte, 5¼-in., double-side diskette drive; a 20M-byte fixed disk drive; a serial/parallel adapter card; and the IBM Enhanced Personal Computer Keyboard. The single unit price for the PC XT Model 286 is $3,995.

IBM offers three options for a second half-height, double-side drive. A 3½-in., 720K-byte internal drive, priced at $190, allows the PC XT to exchange data with the IBM PC Convertible. Two 5¼-in. drives, a 1.2M-byte drive priced at $275 and a 360K-byte drive that costs $225, are also optional. The PC XT supports the IBM Personal Computer 3½-in. external diskette drive as well.

The IBM RT PC 6151 Model 15 offers twice the internal memory — 2M bytes — and nearly double the disk storage — 70M bytes — of the RT PC 6151 Model 10. The RT PC line consists of 32-bit, multitasking, multiuser workstations based on IBM's reduced instruction set computer architecture and its 32-bit microprocessors. The 6151 Model 15 costs $10,050 in single quantities.

AIX 2.1, a version of the Unix-based AIX operating system for the RT PC, handles up to 16 users concurrently. It also provides the RT PC with Systems Network Architecture (SNA) capabilities to support LU1, LU2, LU3 or LU6.2 protocols over an IBM Synchronous Data Link Control connection. AIX 2.1, which will be available in March 1987, will carry a one-time license charge of $895. An upgrade for Version 1.1 costs $100.

Netview/PC is a program for IBM PCs that allows devices on an IBM Token-Ring or other non-SNA network as well as devices on a non-IBM network to be managed by a central site operator. Netview/PC has a one-time fee of $2,000.

The IBM 3162 display station is a 14-in., general-purpose ASCII terminal that diplays almost twice as many characters per screen as other displays in the 3160 family. The 3162 attaches to the IBM Series/1, System/88 and IBM PC, including the RT PC. In single quantities, the 3162 costs $645.

IBM also introduced several emulation cartridges for the 3160 terminal family. Digital Equipment Corp. VT220, VT100 or VT52 emulation for DEC terminals is available. The 10 ASCII emulation cartridges allow the 3162 to emulate 10 non-IBM terminals including monitors from Televideo Systems, Inc., Lear Siegler, Inc., Applied Digital Data Systems, Inc. and Hazeltine Corp. IBM's Wyse Technology, Inc. cartridge provides Wyse 50 and 50 Plus emulation. All three cartridges sell for $50.

For more information, contact IBM Information Systems Group, 900 King St., Rye Brook, N.Y. 10573.

Circle Reader Service Number 295

MICROCOMPUTER PRODUCTS

Hewlett-Packard Introduces Networking Products

CUPERTINO, Calif. — Hewlett-Packard Co. has announced several networking products.

HP Starlan is an industry-standard, twisted-pair, local-area network for the office environment that gives users access to disk and file sharing and printer spooling through an HP 3000 minicomputer or personal computer servers.

HP Starlan also supports terminal emulation with file transfer from a personal computer to an HP 3000.

The HP Starlan server kit costs $1,365. Also required is a configuration and diagnostics pack that sells for $795 for PCs and $3,595 for the HP 3000. The Starlan hub, required to connect the nodes physically, costs $1,375.

HP SNAlink/3270 enables HP Vectra and Portable Plus micros remotely connected to an IBM host computer to emulate an IBM 3270 display station.

SNAlink/3270 allows these micros to share data and files with any IBM host running in VM/CMS, MVS/TSO or the CICS operating environments.

HP SNAlink/3270 for the HP Vectra PC and Portable Plus PC requires a minimum of 512K bytes of random-access memory, one floppy disk drive and a synchronous modem. HP SNAlink/3270 costs $840 for the Portable Plus and $990 for the Vectra.

HP Officeconnect-To-Disoss and HP LU6.2 work together to increase data sharing and communications between HP and IBM systems.

Together the products support electronic mail exchange, filing and automatic document conversion between an HP 3000 mini running HP Deskmanager office software and an IBM mainframe running IBM Distributed Office Support Systems office software.

HP Officeconnect-To-Disoss is priced at $1,400 for the HP 3000 Series 37 and $3,500 for the HP 3000 Series 42, 52, 58 and 70. The HP LU6.2 product costs $3,200 for the HP 3000 Series 37 and $8,000 for the HP 3000 Series 42, 52, 58 and 70.

HP Serial Network software is said to provide remote connection to HP minis and micros through RS-232 interfaces for data transfer and file sharing up to 9.6K bit/sec. speed.

HP Serial Network software costs $295 for the PC version, $395 for the HP 3000 Series 37 and $895 for the HP Series 42, 52, 58 and 70.

For additional information, contact Hewlett-Packard Co., 19420 Homestead Road, Cupertino, Calif. 95014.

Circle Reader Service Number 296

Aldus Pagemaker Out For AT, Mac

SEATTLE — Aldus Corp. announced a version of its Pagemaker desktop publishing application for the IBM Personal Computer AT and compatibles and an enhanced version of Pagemaker for the Apple Computer, Inc. Macintosh.

Pagemaker for the PC, like its Mac counterpart, sets up a screen as an electronic pasteup board and gives users a toolbox of design aids for electronic page composition. The program includes a built-in text editor and allows proportional scaling and cropping of graphics elements. It supports up to 20 columns and allows users to create master page formats for recurring design elements.

Pagemaker for the PC operates under Microsoft Corp.'s Windows and features a user interface similar to the Macintosh version of Pagemaker. The software directly integrates text-formatted word processing application files and unformatted ASCII files. It also can import bitmap graphics and some object-oriented graphics directly and bring in other types of graphics through the Microsoft Windows Clipboard.

Has three additional capabilities

Other features include multiple typefaces and styles, variable type sizes and line spacing and a library of graphic elements. However, unlike Pagemaker Version 1 for the Macintosh, the PC version has three additional capabilities: automatic dictionary-based hyphenation, the ability to handle larger documents and typographic functions such as kerning.

Pagemaker for the PC will retail for $695 and will be available in late 1986. Aldus is scheduled to release foreign language versions in early 1987.

Pagemaker 2.0 for the Macintosh includes many of the features introduced in the PC version of the product including automatic dictionary-based hyphenation, typographic functions such as kerning and variable word and letter spacing, the ability to design and edit facing pages as two-page spreads and the capacity for working with larger publications.

Version 2.0 will be available by the end of 1986 for $495, and foreign language versions will be released in early 1987. In addition, customers who buy Pagemaker between now and the end of the year can receive a free copy of Version 2.0.

For more information, contact Aldus, Corp., Suite 200, 411 First Ave. S., Seattle, Wash. 98104.

Circle Reader Service Number 297

MICROCOMPUTER PRODUCTS

Tool Allows Micros To Extract Mainframe Data

MONTREAL — Micro Tempus, Inc. has introduced Tempus-Access, a product that enables IBM Personal Computer and PC-compatible users to select, extract and sort IBM mainframe data and bring the data into numerous micro applications, including Lotus Development Corp.'s 1-2-3 and Ashton-Tate's Dbase III.

According to Micro Tempus, the link provides users with features such as job submission tools, symbolic variables, block insertions and mainframe security. Advanced users can also submit any IBM JCL stream directly from virtual disk into micro applications.

Users can extract information from multiple mainframe files and data bases in a single request and call Tempus-Access directly from IBM PC-DOS or, when memory resident, from any micro application.

Tempus-Access has a micro and a mainframe component. The micro component enables users to specify the data they want by filling in screens and creating a request in memory.

Users can also edit a request; save a request to disk, creating a request file; load a request from disk into memory; and send a request to the mainframe for batch execution.

The mainframe component of Tempus-Access consists of two parts. An online facility takes a user's request from the micro, translates it into data extractor DYL-270 statements and submits the resulting batch job. A batch facility uses DYL-270 to extract, sort and write the data to virtual disk.

Tempus-Access is priced at $13,900 for the IBM MVS version and $9,900 for the IBM DOS/VSE version. Tempus-Access without DYL-270 is priced at $9,500 for MVS and $6,900 for DOS/VSE.

For further information, contact Micro Tempus, Inc., Suite 300, 440 Dorchester Blvd. W., Montreal, Que., Canada H2Z 1V7.

Circle Reader Service Number 298

Lotus Unwraps HAL For 1-2-3

CAMBRIDGE, Mass. — Lotus Development Corp. has introduced HAL, a memory-resident product that works directly with Lotus's 1-2-3 to create and manipulate work sheets.

HAL enables the use of English language phrases to express 1-2-3 commands to simplify tasks such as entering formulas; formatting, moving and copying data; creating graphics; and sorting data bases. Lotus claims that with a single phrase HAL can perform a series of 1-2-3 operations, ranging from repetitive tasks to advanced procedures.

HAL also allows users to reverse the last operation executed, to highlight or display all formulas or relationships in a range, to link one spreadsheet to another, to find and replace words and numbers and to keep a log of commands for review and correction.

The Undo facility

Lotus explained that the Undo facility, which reverses the last operation executed, is helpful for "what-if" analyses when toggling back and forth between two scenarios.

HAL requires 1-2-3 Release 2.01, Release 2 or Release 1A for personal computers from IBM, Compaq Computer Corp. and AT&T plus 1-2-3-certified compatibles. It also requires Microsoft Corp.'s MS-DOS 2.0 or higher.

HAL resides in memory with 1-2-3. A minimum system configuration of 512K bytes of random-access memory is required. Priced at $150, HAL does not operate with 1-2-3 on the IBM PCjr, IBM PC Convertible or 1-2-3 Release 1A for the IBM 3270-PC.

For further information, contact Lotus Development Corp., 55 Cambridge Pkwy., Cambridge, Mass. 02142.

Circle Reader Service Number 299

PCs Get CICS Emulation Product

PALO ALTO, Calif. — Micro Focus, Inc. introduced PC-CICS, a package that emulates an IBM CICS mainframe transaction processing monitor on an IBM Personal Computer XT, AT or compatible.

Used as a companion product with Micro Focus's VS Cobol Workbench Version 1.2, PC-CICS supports the compilation and execution of CICS command-level Cobol programs, supporting a range of IBM basic mapping support and VSAM key-sequenced data set commands on a PC. Users can test CICS software, migrate certain applications to a PC and develop software that will run on both a PC and a mainframe.

PC-CICS requires a minimum hardware configuration of an IBM PC XT or compatible with 512K bytes of random-access memory, a 10M-byte, hard-disk system and an IBM monochrome display and adapter. The operating environment required by PC-CICS is IBM PC-DOS Versions 2.0, 2.1, 3.0 or 3.1. PC-CICS is available now on controlled release at an introductory price of $1,500.

For more information, contact Micro Focus, Inc., Suite 400, 2465 E. Bayshore Road, Palo Alto, Calif. 94303.

Circle Reader Service Number 300

MACWORLD Expo/San Francisco comes to Moscone Center January 8-10.

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CALENDAR

Nov. 15, Boston — **Lotus 1-2-3 for Marketing Applications.** Contact: Micromentor, University Place, 124 Mt. Auburn St., Cambridge, Mass. 02138.

Nov. 17-21, Atlanta — **The James Martin Seminar.** Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Nov. 18, Boston — **Data Base Applications Using Dbase III.** Contact: Micromentor, University Place, 124 Mt. Auburn St., Cambridge, Mass. 02138.

Nov. 18-20, New York — **Relational Data Base Management Systems.** Also being held Jan. 14-16, San Diego. Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

Nov. 18-20, San Francisco — **Localnet '86.** Contact: Online International, Inc., 989 Avenue of the Americas, New York, N.Y. 10018.

Nov. 18-20, San Francisco — **International ISDN Conference.** Contact: Online International, Inc., 989 Avenue of the Americas, New York, N.Y. 10018.

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Nov. 18-21, Boston — **Computer Network Design & Protocols.** Also being held Dec. 2-5, Washington, D.C.; Dec. 9-12, Palo Alto, Calif.; Jan. 27-30, Anaheim, Calif.; Feb. 10-13, San Diego. Contact: Integrated Computer Systems, P.O. Box 3614, 5800 Hannum Ave., Culver City, Calif. 90231.

Nov. 20-21, Washington, D.C. — **Micro-Mainframe Links.** Also being held Nov. 20-21, Washington, D.C.; Dec. 11-12, Los Angeles; Jan. 22-23, San Diego. Contact: Integrated Computer Systems, P.O. Box 3614, 5800 Hannum Ave., Culver City, Calif. 90231.

Nov. 20-21, Boston — **Releasing the Power of PC-DOS and MS-DOS.** Also being held Dec. 4-5, Philadelphia. Contact: The American Institute, Carnegie Building, 55 Main St., Madison, N.J. 07940.

Dec. 1-3, Boston — **Changes in the Information Center: Traditional Roles Expand to Support OA and PCs.** Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Dec. 3-4, San Francisco — **DEC: The Next Five Years.** Contact: The Yankee Group, 14th Floor, 89 Broad St., Boston, Mass. 02110.

Dec. 3-5, San Francisco — **Decision Support Systems: Micros Through Mainframes.** Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Dec. 8-9, Boston — **Advanced Systems Forum.** Contact: Online International, Inc., 989 Avenue of the Americas, New York, N.Y. 10018.

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Dec. 9-10, Los Angeles — **Distributed Data Base: How to Integrate Data in a Multivendor Environment.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

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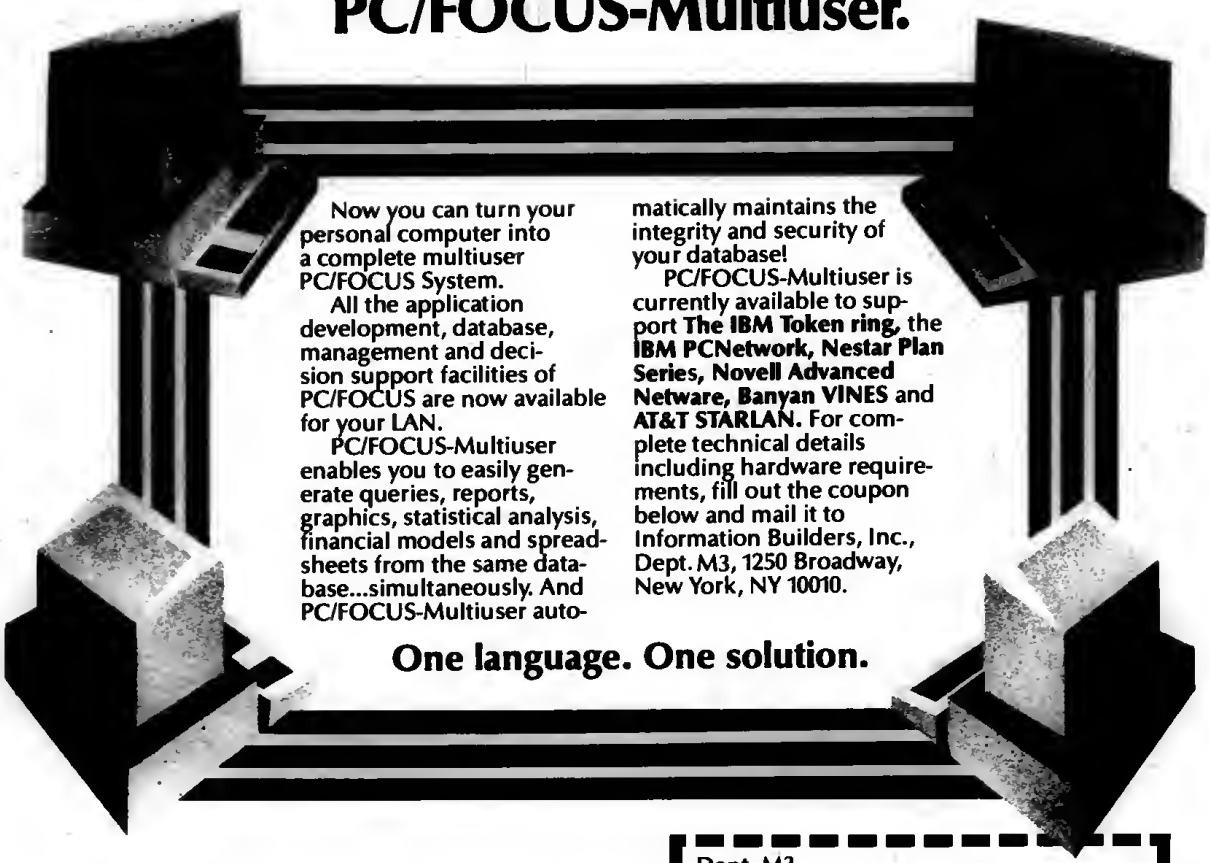

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